

DOCKET NO.: 231751US26YA

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

IN RE APPLICATION OF:

Eric J STRANG

SERIAL NO: 10/673,507

GROUP: 2128

FILED: September 30, 2003

EXAMINER: Saxena, Akash

FOR: SYSTEM AND METHOD FOR USING FIRST-PRINCIPLES SIMULATION  
TO CONTROL A SEMICONDUCTOR MANUFACTURING PROCESS

**LETTER**

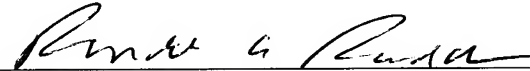
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

Submitted herewith is a Chinese Office Action for the Examiner's consideration. The reference cited therein has been previously cited in the Office Action of October 5, 2006.

Respectfully Submitted,

OBLON, SPIVAK, McCLELLAND,  
MAIER & NEUSTADT, P.C.



Steven P. Weihrouch  
Registration No. 32,829

Customer Number

**22850**

Tel. (703) 413-3000  
Fax. (703) 413-2220  
(OSMMN 03/06)

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Ronald A. Rudder, Ph.D.  
Registration No. 45,618



100738 北京市东城区东长安街1号东方广场东方经贸城东2座1602室 北京东方亿思知识产权代理有限公司 王怡	发文日
申请号: 2004800285180	
申请人: 东京毅力科创株式会社	
发明名称: 用于工具上半导体仿真的系统和方法	

## 第一次审查意见通知书

(进入国家阶段的 PCT 申请)

1. ☒ 应申请人提出的实审请求, 根据专利法第 35 条第 1 款的规定, 国家知识产权局对上述发明专利申请进行实质审查。  
☐ 根据专利法第 35 条第 2 款的规定, 国家知识产权局专利局决定自行对上述发明专利申请进行审查。
2. ☒ 申请人要求以其在:  
US 专利局的申请日 2003 年 09 月 30 日为优先权日,  
US 专利局的申请日 2003 年 09 月 30 日为优先权日,  
专利局的申请日 年 月 日为优先权日。
3. ☐ 申请人于 年 月 日和 年 月 日以及 年 月 日提交了修改文件。  
经审查, 申请人于 年 月 日提交的 不符合专利法实施细则第 51 条第 1 款的规定。  
☐
4. ☒ 审查是针对原始提交的国际申请的中文译文进行的。  
☐ 审查是针对下述申请文件进行的:  
☐ 说明书 第 页, 按照进入中国国家阶段时提交的国际申请文件的中文文本;  
第 页, 按照专利性国际初步报告附件的中文文本;  
第 页, 按照依据专利合作条约第 28 条或 41 条规定所提交的修改文件;  
第 页, 按照依据专利法实施细则第 51 条第 1 款规定所提交的修改文件;  
第 页, 按照 年 月 日所提交的修改文件。  
☐  
☐ 权利要求 第 项, 按照进入中国国家阶段时提交的国际申请文件的中文文本;  
第 项, 按照依据专利合作条约第 19 条规定所提交的修改文件的中文文本;  
第 项, 按照专利性国际初步报告附件的中文文本;  
第 项, 按照依据专利合作条约第 28 条或 41 条规定所提交的修改文件;  
第 项, 按照依据专利法实施细则第 51 条第 1 款规定所提交的修改文件;  
第 项, 按照 年 月 日所提交的修改文件。  
☐  
☐ 附图 第 页, 按照进入中国国家阶段时提交的国际申请文件的中文文本;  
第 页, 按照专利性国际初步报告附件的中文文本;  
第 页, 按照依据专利合作条约第 28 条或 41 条规定所提交的修改文件;  
第 页, 按照依据专利法实施细则第 51 条第 1 款规定所提交的修改文件;  
第 页, 按照 年 月 日所提交的修改文件。





☒ 本通知书引用下述对比文件(其编号在今后的审查过程中继续沿用):

编号

文件号或名称

公开日期(或抵触申请的申请日)

1

US5719796A

1998-02-17

5. 审查的结论性意见:

☐ 关于说明书:

☐ 申请的内容属于专利法第 5 条规定的不授予专利权的范围。

☐ 说明书不符合专利法第 26 条第 3 款的规定。

☐ 说明书不符合专利法第 33 条的规定。

☐ 说明书的撰写不符合专利法实施细则第 18 条的规定。

☒ 关于权利要求书:

☐ 权利要求 不具备专利法第 22 条第 2 款规定的新颖性。

☒ 权利要求 1-61, 63-109 不具备专利法第 22 条第 3 款规定的创造性。

☐ 权利要求 不具备专利法第 22 条第 4 款规定的实用性。

☒ 权利要求 62, 110 属于专利法第 25 条规定的不授予专利权的范围。

☐ 权利要求 不符合专利法第 26 条第 4 款的规定。

☐ 权利要求 不符合专利法第 31 条第 1 款的规定。

☐ 权利要求 不符合专利法第 33 条的规定。

☐ 权利要求 不符合专利法实施细则第 2 条第 1 款的规定。

☐ 权利要求 不符合专利法实施细则第 13 条第 1 款的规定。

☐ 权利要求 不符合专利法实施细则第 20 条的规定。

☐ 权利要求 不符合专利法实施细则第 21 条的规定。

☐ 权利要求 不符合专利法实施细则第 22 条的规定。

☐ 权利要求 不符合专利法实施细则第 23 条的规定。

☐ 分案的申请不符合专利法实施细则第 43 条第 1 款的规定。

上述结论性意见的具体分析见本通知书的正文部分。

6. 基于上述结论性意见, 审查员认为:

☐ 申请人应按照通知书正文部分提出的要求, 对申请文件进行修改。

☐ 申请人应在意见陈述书中论述其专利申请可以被授予专利权的理由, 并对通知书正文部分中指出的不符合规定之处进行修改, 否则将不能授予专利权。

☒ 专利申请中没有可以被授予专利权的实质性内容, 如果申请人没有陈述理由或者陈述理由不充分, 其申请将被驳回。

7. 申请人应注意下述事项:

(1) 根据专利法第 37 条的规定, 申请人应在收到本通知书之日起的肆个月内陈述意见, 如果申请人无正当理由逾期不答复, 其申请将被视为撤回。

(2) 申请人对其申请的修改应符合专利法第 33 条的规定, 修改文本应一式两份, 其格式应符合审查指南的有关规定。

(3) 申请人的意见陈述书和 / 或修改文本应邮寄或递交国家知识产权局专利局受理处, 凡未邮寄或递交给受理处的文件不具备法律效力。

(4) 未经预约, 申请人和 / 或代理人不得前来国家知识产权局专利局与审查员举行会晤。

8. 本通知书正文部分共有 23 页, 并附有下列附件:

☒ 引用的对比文件的复印件共 1 份 6 页。



审查员: 明媚 (A443)

2007 年 8 月 21 日

审查部门

电学发明审查部

21302  
2006. 7



回函请寄: 100088 北京市海淀区蓟门桥西土城路 6 号 国家知识产权局专利局受理处收  
(注: 凡寄给审查员个人的信函不具有法律效力)

## 第一次审查意见通知书正文

申请号：2004800285180

该申请请求保护一种用于工具上半导体仿真的系统和方法。经审查，现提出如下的审查意见：

1、权利要求1不具备专利法第二十二条第三款规定的创造性。权利要求1请求保护一种用于辅助半导体处理工具所执行的处理的方法。对比文件1(US5719796A)公开了一种半导体制造过程的统计仿真方法和系统，并具体公开了以下技术特征(参见对比文件1的说明书第3栏第48—57行，第4栏第55—67行，第5栏第1—67行，第6栏第34—44行，第7栏第1—55行，第9栏第4—14行，第39—42行、图2)：制造设备210(相当于权利要求1中的半导体处理工具)；通过测试设备获取处理参数(相当于权利要求1中的输入与所述半导体处理工具所执行的处理有关的数据)；仿真系统的两个过程包括两种不同的操作运行模式，输入数据可以以若干种形式被应用，输入数据在实际处理之前被转换成统计分布函数，每一次单个的仿真根据相应的物理或设备模型处理输入数据(相当于权利要求1中的输入与所述半导体处理工具有关的第一原理物理模型)；仿真器根据参数和概率密度函数模型进行仿真，生成结果；根据得到的结果反馈到制作过程(相当于权利要求1中的使用所述输入数据和所述物理模型来执行第一原理仿真，以提供与所述半导体处理工具所执行的处理有关的虚拟传感器测量，使用所述虚拟传感器测量来辅助所述半导体处理工具所执行的处理)。

权利要求1请求保护的技术方案与对比文件1所公开的内容相比，其区别仅在于名称和表述上的不同，而这种名称和表述上的差异是本领域技术人员容易想到的。因此在对比文件1的基础上结合本领域的公知常识从而得到权利要求1请求保护的技术方案，对本领域技术人员来说是显而易见的，因此权利要求1要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

2、权利要求2不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第3栏第48—57行，第4栏第55—67行，第5栏第1—67行，第7栏第1—22行，第9栏第4—14行、图2)：测试设备包括残余气体分析器、光谱分析器等在现有制造领域已知的类似数据获取工具，这些测试设备可以是物理地安装在制作设备上的，在制造过程的各个阶段过程参数都是通过测试设备获取的(相当于权利要求2中的所述输入操作包括从被物理地安装在所述半导体处理工具上的物理传感器和度量工具中的至少一个直接输入与所述半导体处理工具所执行的处理有

关的数据)，其公开了权利要求2的附加技术特征。因此在权利要求2引用的权利要求1不具备创造性的情况下，权利要求2要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

3、权利要求3不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第3栏第48—57行，第4栏第55—67行，第5栏第1—67行，第7栏第1—22行，第9栏第4—14行、图2)：测试设备包括残余气体分析器、光谱分析器等在现有制造领域已知的类似数据获取工具，其中现有制造领域已知的类似数据获取工具必然包括手工输入设备，WET数据或在线参数包含在已有数据表中，将它们代替计算的值(相当于权利要求3中的所述输入操作包括从手工输入设备和数据库中的至少一个间接输入与所述半导体处理工具所执行的处理有关的数据)，其公开了权利要求3的附加技术特征。因此在权利要求3引用的权利要求1不具备创造性的情况下，权利要求3要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

4、权利要求4不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第3栏第48—57行，第4栏第55—67行，第5栏第1—67行，第7栏第1—22行，第9栏第4—14行、图2)：仿真运行使用输入的参数可以是来自实际在线测量的数据(相当于权利要求4中的所述间接输入操作包括从所述半导体处理工具先前执行的处理而记录的数据)，其公开了权利要求4的附加技术特征。因此在权利要求4引用的权利要求3不具备创造性的情况下，权利要求4要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

5、权利要求5不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第3栏第48—57行，第4栏第55—67行，第5栏第1—67行，第7栏第1—22行，第9栏第4—14行、图2)：特殊过程参数被独立地指定(相当于权利要求5中的所述间接输入操作输入由仿真操作者设置的数据)，其公开了权利要求5的附加技术特征。因此在权利要求5引用的权利要求3不具备创造性的情况下，权利要求5要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

6、权利要求6不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第3栏第48—57行，第4栏第55—67行，第5栏第1—67行，第7栏第1—22行，第9栏第4—14行、图2)：测试设备包括残余气体分析

器、光谱分析器等在现有制造领域已知的类似数据获取工具（相当于权利要求6中的所述输入数据的操作包括输入与所述半导体工具环境和所述半导体处理工具的物理特性中的至少一个有关的数据），其公开了权利要求6的附加技术特征。因此在权利要求6引用的权利要求1不具备创造性的情况下，权利要求6要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

7、权利要求7不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征（参见对比文件1的说明书第3栏第48—57行，第4栏第55—67行，第5栏第1—67行，第7栏第1—22行，第9栏第4—14行、图2）：仿真运行使用输入的参数可能是来自实际在线测量的数据（相当于权利要求7中的所述输入数据的操作包括输入与所述半导体处理工具所执行的处理的特性和结果中的至少一个有关的数据），其公开了权利要求7的附加技术特征。因此在权利要求7引用的权利要求1不具备创造性的情况下，权利要求7要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

8、权利要求8不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征（参见对比文件1的说明书第3栏第48—57行，第4栏第55—67行，第5栏第1—67行，第7栏第1—22行，第9栏第4—14行、图2）：输入数据可以以若干种形式被应用，输入数据在实际处理之前被转换成统计分布函数（相当于权利要求8中的输入第一原理物理模型包括输入所述半导体处理工具的几何的空间解析模型），其公开了权利要求8的附加技术特征。因此在权利要求8引用的权利要求1不具备创造性的情况下，权利要求8要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

9、权利要求9不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征（参见对比文件1的说明书第3栏第48—57行，第4栏第55—67行，第5栏第1—67行，第7栏第1—22行，第9栏第4—14行、图2）：输入数据可以以若干种形式被应用，输入数据在实际处理之前被转换成统计分布函数（相当于权利要求9中的输入第一原理物理模型包括输入执行第一原理仿真以获得虚拟传感器所需的基本等式），其公开了权利要求9的附加技术特征。因此在权利要求9引用的权利要求1不具备创造性的情况下，权利要求9要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

10、权利要求10不具备专利法第二十二条第三款规定的创造性。对比文件1具体公

开了以下技术特征(参见对比文件1的说明书第3栏第48—57行,第4栏第55—67行,第5栏第1—67行,第7栏第1—22行,第9栏第4—14行、图2):实际的在线过程和仿真过程都是自动的、并发执行(相当于权利要求10中的所述执行第一原理仿真包括与所述半导体处理工具所执行的处理并发地执行第一原理仿真),其公开了权利要求10的附加技术特征。因此在权利要求10引用的权利要求1不具备创造性的情况下,权利要求10要求保护的技术方案不具备突出的实质性特点和显著的进步,因而不具备创造性。

11、权利要求11不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第3栏第55—57行,第4栏第47—67行,第5栏第1—67行):校准处理的结果被进行比较,测量参数根据比较结果进行更新,仿真处理根据这些特定的处理参数进行(相当于权利要求11中的在半导体处理期间反复地更新来自所述物理传感器或度量工具的数据,使用更新后的数据执行第一原理仿真);校准处理包括与实际测量相应的仿真步骤,实际的在线过程和仿真过程都是自动的、并发执行(相当于权利要求11中的基于半导体处理期间获得的虚拟传感器测量,与运行半导体处理并发地辅助所述半导体处理),其公开了权利要求11的附加技术特征。因此在权利要求11引用的权利要求10不具备创造性的情况下,权利要求11要求保护的技术方案不具备突出的实质性特点和显著的进步,因而不具备创造性。

12、权利要求12不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第1栏第55—58行、第3栏第48—57行、第4栏第55—67行、第5栏第1—67行、第7栏第1—22行、第9栏第4—14行、第39—42行、图2):WET数据包括各种设备电子参数包括电压极限值和最大跨导等(相当于权利要求12中的在半导体处理开始之前,设置用于第一原理仿真的边界条件);校准处理包括与实际测量相应的仿真步骤,实际的在线过程和仿真过程都是自动的、并发执行(相当于权利要求12中的基于半导体处理期间获得的虚拟传感器测量,与运行半导体处理并发地辅助所述半导体处理);而可以在半导体处理期间并且没有来自半导体处理器的直接输入的情况下,执行对半导体处理的时间相关仿真,这种技术手段的应用是本领域技术人员容易想到的,因此在权利要求12引用的权利要求10不具备创造性的情况下,权利要求12要求保护的技术方案不具备突出的实质性特点和显著的进步,因而不具备创造性。

13、权利要求13不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第1栏第55—58行、第3栏第48—57行、第4

栏第55—67行、第5栏第1—67行、第7栏第1—22行、第9栏第4—14行、图2)：实际的在线过程和仿真过程是相互独立地执行的（相当于权利要求13中的执行第一原理仿真包括不与所述半导体处理工具所执行的处理并发地来执行第一原理仿真），其公开了权利要求13的附加技术特征。因此在权利要求13引用的权利要求1不具备创造性的情况下，权利要求13要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

14、权利要求14不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第1栏第55—58行、第3栏第48—57行、第4栏第55—67行、第5栏第1—67行、第7栏第1—22行、第9栏第4—14行、第39—42行、图2)：仿真器根据输入的参数进行仿真，WET数据包括各种设备电子参数包括电压极限值和最大跨导等（相当于权利要求14中的输入数据的操作包括输入从先前执行的处理而记录的所述第一原理仿真的初始和边界条件中的至少一个），其公开了权利要求14的附加技术特征。因此在权利要求14引用的权利要求13不具备创造性的情况下，权利要求14要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

15、权利要求15不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第1栏第55—58行、第3栏第48—57行、第4栏第55—67行、第5栏第1—67行、第7栏第1—22行、第9栏第4—14行、第39—42行、图2)：仿真器根据输入的参数进行仿真（相当于权利要求15中的间接输入操作包括输入用于所述物理模型的最佳已知输入参数），其公开了权利要求15的附加技术特征。因此在权利要求15引用的权利要求3不具备创造性的情况下，权利要求15要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

16、权利要求16不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第7栏第61—64行，第8栏第4—8行)：校准处理结果与实际测量参数进行比较（相当于权利要求16中的将虚拟传感器测量与实际传感器测量进行比较）；基于数据比较步骤决定是否使用仿真或实际数据来改变仿真数据（相当于权利要求16中的细化最佳已知输入参数和物理模型中的至少一个，以获得虚拟传感器测量与实际传感器测量之间更好的一致）；其公开了权利要求16的附加技术特征。因此在权利要求16引用的权利要求15不具备创造性的情况下，权利要求16要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。



17、权利要求17不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第1栏第55—58行、第3栏第48—57行、第4栏第55—67行、第5栏第1—67行、第7栏第1—22行、第9栏第4—14行、第39—42行、图2)：仿真器根据参数和概率密度函数模型进行仿真，生成结果（相当于权利要求17中的虚拟传感器测量包括使用虚拟传感器测量来表征半导体处理工具所执行的处理），其公开了权利要求17的附加技术特征。因此在权利要求17引用的权利要求1不具备创造性的情况下，权利要求17要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

18、权利要求18不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第1栏第55—58行、第3栏第48—57行、第4栏第55—67行、第5栏第1—67行、第7栏第1—22行、第9栏第4—14行、第39—42行、图2)：根据实际在线测量数据通过制造控制系统提供给仿真过程（相当于权利要求18中的虚拟传感器测量包括使用虚拟传感器测量来控制半导体处理工具所执行的处理），其公开了权利要求18的附加技术特征。因此在权利要求18引用的权利要求1不具备创造性的情况下，权利要求18要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

19、权利要求19不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第1栏第55—58行、第3栏第48—57行、第4栏第55—67行、第5栏第1—67行、第7栏第1—22行、第9栏第4—14行、第39—42行、图2)：根据仿真结果提高仿真精确度、通过不同仿真步骤间的交互减少传播错误，根据得到的结果反馈到制作过程，隐含公开了使用虚拟传感器测量来检测半导体处理工具所执行的处理中的故障。因此在权利要求19引用的权利要求1不具备创造性的情况下，权利要求19要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

20、权利要求20不具备专利法第二十二条第三款规定的创造性。权利要求20的附加技术特征为：将虚拟传感器测量存储在库中以便以后在第一原理仿真中使用。而根据实际需要，可以将数据存储在库中以便利用是本领域技术人员容易想到的。因此在权利要求20引用的权利要求1不具备创造性的情况下，权利要求20要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

21、权利要求21不具备专利法第二十二条第三款规定的创造性。对比文件1具体公

开了以下技术特征(参见对比文件1的说明书第1栏第55—58行、第3栏第48—57行、第4栏第55—67行、第5栏第1—67行、第7栏第1—22行、第9栏第4—14行、第39—42行、图2): 根据实际在线测量数据, 通过网络连接到应用服务器, 提供给仿真过程(相当于权利要求21中的使用互联资源的网络来执行处理步骤), 其公开了权利要求21的附加技术特征。因此在权利要求21引用的权利要求1不具备创造性的情况下, 权利要求21要求保护的技术方案不具备突出的实质性特点和显著的进步, 因而不具备创造性。

22、权利要求22不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第1栏第55—58行、第3栏第48—57行、第4栏第55—67行、第5栏第1—67行、第7栏第1—22行、第9栏第4—14行、第39—42行、图2): 根据实际在线测量数据, 例如方向数据通过连接到应用服务器的网络、或者通过制造控制系统的远程访问通道、或者通过制造控制系统提供给仿真过程, 隐含公开了网络中互连资源之间的代码并行化来分摊第一原理仿真的计算负荷。因此在权利要求22引用的权利要求21不具备创造性的情况下, 权利要求22要求保护的技术方案不具备突出的实质性特点和显著的进步, 因而不具备创造性。

23、权利要求23不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第1栏第55—58行、第3栏第48—57行、第4栏第55—67行、第5栏第1—67行、第7栏第1—22行、第9栏第4—14行、第39—42行、图2): 根据实际在线测量数据, 例如方向数据通过连接到应用服务器的网络、或者通过制造控制系统的远程访问通道、或者通过制造控制系统提供给仿真过程, 隐含公开了在互连资源之间共享仿真信息来控制半导体处理工具所执行的处理。因此在权利要求23引用的权利要求21不具备创造性的情况下, 权利要求23要求保护的技术方案不具备突出的实质性特点和显著的进步, 因而不具备创造性。

24、权利要求24不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第1栏第55—58行、第3栏第48—57行、第4栏第55—67行、第5栏第1—67行、第7栏第1—22行、第9栏第4—14行、第39—42行、图2): 根据实际在线测量数据, 例如方向数据通过连接到应用服务器的网络、或者通过制造控制系统的远程访问通道、或者通过制造控制系统提供给仿真过程, 隐含公开了在互连资源之间分发仿真结果, 必然减少不同资源对第一原理仿真的冗余执行。因此在权利要求24引用的权利要求23不具备创造性的情况下, 权利要求24要求保护的技术方案不具备突出的实质性特点和显著的进步, 因而不具备创造性。

25、权利要求25不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第1栏第55—58行、第3栏第48—57行、第4栏第55—67行、第5栏第1—67行、第7栏第1—22行、第9栏第4—14行、第39—42行、图2)：根据实际在线测量数据，例如方向数据通过连接到应用服务器的网络、或者通过制造控制系统的远程访问通道、或者通过制造控制系统提供给仿真过程，隐含公开了在互连资源之间分发模型改变，以减少不同资源对第一原理仿真的冗余细化。因此在权利要求25引用的权利要求23不具备创造性的情况下，权利要求25要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

26、权利要求26不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第1栏第55—58行、第3栏第48—57行、第4栏第55—67行、第5栏第1—67行、第7栏第1—22行、第9栏第4—14行、第39—42行、图2)：根据实际在线测量数据，例如方向数据通过网络像TCP/IP连接到应用服务器，提供给仿真过程(相当于权利要求26中的经由广域网使用远程资源以辅助半导体处理工具所执行的半导体处理)，其公开了权利要求26的附加技术特征。因此在权利要求26引用的权利要求21不具备创造性的情况下，权利要求26要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

27、权利要求27不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第1栏第55—58行、第3栏第48—57行、第4栏第55—67行、第5栏第1—67行、第7栏第1—22行、第9栏第4—14行、第39—42行、图2)：根据实际在线测量数据，通过网络像TCP/IP连接到应用服务器，提供给仿真过程(相当于权利要求27中的经由广域网使用远程计算和存储资源中的至少一个来辅助半导体处理工具所执行的半导体处理)。因此在权利要求27引用的权利要求26不具备创造性的情况下，权利要求27要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

28、权利要求28不具备专利法第二十二条第三款规定的创造性。权利要求28请求保护一种用于辅助半导体处理工具所执行的处理的系统。对比文件1(US5719796A)公开了一种半导体制造过程的统计仿真方法和系统，并具体公开了以下技术特征(参见对比文件1的说明书第3栏第48—57行，第4栏第55—67行，第5栏第1—67行，第6栏第34—44行，第7栏第1—55行，第9栏第4—14行，第39—42行、图2)：制造设备210(相当于权利要求28中半导体处理工具)；通过测试设备获取处理参数(相当于权利要求28中的

被配置为输入与所述半导体处理工具所执行的有关的数据的输入设备)；仿真系统的两个过程包括两种不同的操作运行模式，输入数据可以以若干种形式被应用，输入数据在实际处理之前被转换成统计分布函数，每一次单个的仿真根据相应的物理或设备模型处理输入数据(相当于权利要求28中的第一原理仿真器，输入与所述半导体处理工具有关的第一原理物理模型)；仿真器根据参数和概率密度函数模型进行仿真，生成结果；根据得到的结果反馈到制作过程(相当于权利要求28中的使用所述输入数据和所述物理模型来执行第一原理仿真，以提供与所述半导体处理工具所执行的有关的数据的虚拟传感器测量，使用所述虚拟传感器测量来辅助所述半导体处理工具所执行的有关的数据的处理)。

权利要求28请求保护的技术方案与对比文件1所公开的内容相比，其区别仅在于名称和表述上的不同，而这种名称和表述上的差异是本领域技术人员容易想到的。因此，在对比文件1的基础上结合本领域的公知常识从而得到权利要求28请求保护的技术方案，对本领域技术人员来说是显而易见的，因此权利要求28要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

29、权利要求29不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第3栏第48—57行，第4栏第55—67行，第5栏第1—67行，第7栏第1—22行，第9栏第4—14行、图2)：测试设备包括残余气体分析器、光谱分析器等在现有制造领域已知的类似数据获取工具，这些测试设备可以是物理地安装在制作设备上的，在制造过程的各个阶段过程参数都是通过测试设备获取的(相当于权利要求29中的输入设备包括被物理地安装在所述半导体处理工具上的物理传感器和度量工具中的至少一个)，其公开了权利要求29的附加技术特征。因此在权利要求29引用的权利要求28不具备创造性的情况下，权利要求29要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

30、权利要求30不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第3栏第48—57行，第4栏第55—67行，第5栏第1—67行，第7栏第1—22行，第9栏第4—14行、图2)：测试设备包括残余气体分析器、光谱分析器等在现有制造领域已知的类似数据获取工具，其中现有制造领域已知的类似数据获取工具必然包括手工输入设备，WET数据或在线参数包含在已有数据表中，将它们代替计算的值(相当于权利要求30中的输入设备包括手工输入设备和数据库中的至少一个)，其公开了权利要求30的附加技术特征。因此在权利要求30引用的

权利要求28不具备创造性的情况下，权利要求30要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

31、权利要求31不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第3栏第48—57行，第4栏第55—67行，第5栏第1—67行，第7栏第1—22行，第9栏第4—14行、图2)：仿真运行使用输入的参数可以是来自实际在线测量的数据(相当于权利要求31中的输入设备被配置为输入从所述半导体处理工具先前执行的处理而记录的数据)，其公开了权利要求31的附加技术特征。因此在权利要求31引用的权利要求30不具备创造性的情况下，权利要求31要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

32、权利要求32不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第3栏第48—57行，第4栏第55—67行，第5栏第1—67行，第7栏第1—22行，第9栏第4—14行、图2)：特殊过程参数被独立地指定(相当于权利要求32中的输入设备被配置为输入由仿真操作者设置的数据)，其公开了权利要求32的附加技术特征。因此在权利要求32引用的权利要求30不具备创造性的情况下，权利要求32要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

33、权利要求33不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第3栏第48—57行，第4栏第55—67行，第5栏第1—67行，第7栏第1—22行，第9栏第4—14行、图2)：测试设备包括残余气体分析器、光谱分析器等在现有制造领域已知的类似数据获取工具(相当于权利要求33中的输入设备被配置为输入与所述半导体工具环境和所述半导体处理工具的物理特性中的至少一个有关的数据)，其公开了权利要求33的附加技术特征。因此在权利要求33引用的权利要求28不具备创造性的情况下，权利要求33要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

34、权利要求34不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第3栏第48—57行，第4栏第55—67行，第5栏第1—67行，第7栏第1—22行，第9栏第4—14行、图2)：仿真运行使用输入的参数可能是来自实际在线测量的数据(相当于权利要求34中的输入设备被配置为输入与所述半导体处理工具所执行的处理的特性和结果中的至少一个有关的数据)，其公开了权利要求34的附加技术特征。因此在权利要求34引用的权利要求28不具备创造性的情况下，

权利要求34要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

35、权利要求35不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第3栏第48—57行，第4栏第55—67行，第5栏第1—67行，第7栏第1—22行，第9栏第4—14行、图2)：输入数据可以以若干种形式被应用，输入数据在实际处理之前被转换成统计分布函数(相当于权利要求35中的处理器被配置为输入包括所述半导体处理工具的几何的空间解析模型的第一原理物理模型)，其公开了权利要求35的附加技术特征。因此在权利要求35引用的权利要求28不具备创造性的情况下，权利要求35要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

36、权利要求36不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第3栏第48—57行，第4栏第55—67行，第5栏第1—67行，第7栏第1—22行，第9栏第4—14行、图2)：输入数据可以以若干种形式被应用，输入数据在实际处理之前被转换成统计分布函数(相当于权利要求36中的处理器被配置为输入包括执行第一原理仿真以获得虚拟传感器所需的基本等式的第一原理物理模型)，其公开了权利要求36的附加技术特征。因此在权利要求36引用的权利要求28不具备创造性的情况下，权利要求36要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

37、权利要求37不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第3栏第48—57行，第4栏第55—67行，第5栏第1—67行，第7栏第1—22行，第9栏第4—14行、图2)：实际的在线过程和仿真过程都是自动的、并发执行(相当于权利要求37中的处理器被配置为与所述半导体处理工具所执行的处理并发地执行第一原理仿真)，其公开了权利要求37的附加技术特征。因此在权利要求37引用的权利要求28不具备创造性的情况下，权利要求37要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

38、权利要求38不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第3栏第55—57行，第4栏第47—67行，第5栏第1—67行)：校准处理的结果被进行比较，测量参数根据比较结果进行更新，仿真处理根据这些特定的处理参数进行(相当于权利要求38中的在半导体处理期间反复地更新来自所述物理传感器或度量工具的数据，在半导体处理期间反复地使用更新后的

数据执行第一原理仿真)；校准处理包括与实际测量相应的仿真步骤，实际的在线过程和仿真过程都是自动的、并发执行（相当于权利要求38中的基于半导体处理期间获得的虚拟传感器测量，半导体处理与运行半导体处理并发地被辅助），其公开了权利要求38的附加技术特征。因此在权利要求38引用的权利要求37不具备创造性的情况下，权利要求38要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

39、权利要求39不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第1栏第55—58行、第3栏第48—57行、第4栏第55—67行、第5栏第1—67行、第7栏第1—22行、第9栏第4—14行、第39—42行、图2)：WET数据包括各种设备电子参数包括电压极限值和最大跨导等（相当于权利要求39中的在半导体处理开始之前，设置用于第一原理仿真的边界条件）；校准处理包括与实际测量相应的仿真步骤，实际的在线过程和仿真过程都是自动的、并发执行（相当于权利要求39中的基于半导体处理期间获得的虚拟传感器测量，所述半导体处理与运行半导体处理并发地被辅助）；而可以在半导体处理期间并且没有来自半导体处理器的直接输入的情况下，执行对半导体处理的时间相关仿真，这种技术手段的应用是本领域技术人员容易想到的，因此在权利要求39引用的权利要求37不具备创造性的情况下，权利要求39要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

40、权利要求40不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第1栏第55—58行、第3栏第48—57行、第4栏第55—67行、第5栏第1—67行、第7栏第1—22行、第9栏第4—14行、图2)：实际的在线过程和仿真过程是相互独立地执行的（相当于权利要求40中的处理器被配置为不与所述半导体处理工具所执行的处理并发地来执行第一原理仿真），其公开了权利要求40的附加技术特征。因此在权利要求40引用的权利要求28不具备创造性的情况下，权利要求40要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

41、权利要求41不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第1栏第55—58行、第3栏第48—57行、第4栏第55—67行、第5栏第1—67行、第7栏第1—22行、第9栏第4—14行、第39—42行、图2)：仿真器根据输入的参数进行仿真，WET数据包括各种设备电子参数包括电压极限

值和最大跨导等（相当于权利要求41中的处理器被配置为至少通过使用输入数据来设置从先前执行的处理而记录的所述第一原理仿真的初始和边界条件中的至少一个，来执行所述第一原理仿真），其公开了权利要求41的附加技术特征。因此在权利要求41引用的权利要求40不具备创造性的情况下，权利要求41要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

42、权利要求42不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征（参见对比文件1的说明书第1栏第55—58行、第3栏第48—57行、第4栏第55—67行、第5栏第1—67行、第7栏第1—22行、第9栏第4—14行、第39—42行、图2）：仿真器根据输入的参数进行仿真（相当于权利要求42中的输入设备被配置为输入用于所述物理模型的最佳已知输入参数），其公开了权利要求42的附加技术特征。因此在权利要求42引用的权利要求30不具备创造性的情况下，权利要求42要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

43、权利要求43不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征（参见对比文件1的说明书第7栏第61—64行，第8栏第4—8行）：校准处理结果与实际测量参数进行比较（相当于权利要求43中的将虚拟传感器测量与实际传感器测量进行比较）；基于数据比较步骤决定是否使用仿真或实际数据来改变仿真数据（相当于权利要求43中的细化最佳已知输入参数和物理模型中的至少一个，以获得虚拟传感器测量与实际传感器测量之间更好的一致）；其公开了权利要求43的附加技术特征。因此在权利要求43引用的权利要求42不具备创造性的情况下，权利要求43要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

44、权利要求44不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征（参见对比文件1的说明书第1栏第55—58行、第3栏第48—57行、第4栏第55—67行、第5栏第1—67行、第7栏第1—22行、第9栏第4—14行、第39—42行、图2）：仿真器根据参数和概率密度函数模型进行仿真，生成结果（相当于权利要求44中的虚拟传感器测量被用来表征半导体处理工具所执行的处理），其公开了权利要求44的附加技术特征。因此在权利要求44引用的权利要求28不具备创造性的情况下，权利要求44要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

45、权利要求45不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征（参见对比文件1的说明书第1栏第55—58行、第3栏第48—57行、第4



栏第55—67行、第5栏第1—67行、第7栏第1—22行、第9栏第4—14行、第39—42行、图2)：根据实际在线测量数据通过制造控制系统提供给仿真过程（相当于权利要求45中的虚拟传感器测量被用来控制半导体处理工具所执行的处理），其公开了权利要求45的附加技术特征。因此在权利要求45引用的权利要求28不具备创造性的情况下，权利要求45要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

46、权利要求46不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第1栏第55—58行、第3栏第48—57行、第4栏第55—67行、第5栏第1—67行、第7栏第1—22行、第9栏第4—14行、第39—42行、图2)：根据仿真结果提高仿真精确度、通过不同仿真步骤间的交互减少传播错误，根据得到的结果反馈到制作过程，隐含公开了使用虚拟传感器测量来检测半导体处理工具所执行的处理中的故障。因此在权利要求46引用的权利要求28不具备创造性的情况下，权利要求46要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

47、权利要求47不具备专利法第二十二条第三款规定的创造性。权利要求47的附加技术特征为：将虚拟传感器测量存储在库中以便以后在第一原理仿真中使用。而根据实际需要，可以将数据存储在库中以便利用是本领域技术人员容易想到的。因此在权利要求47引用的权利要求28不具备创造性的情况下，权利要求47要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

48、权利要求48不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第1栏第55—58行、第3栏第48—57行、第4栏第55—67行、第5栏第1—67行、第7栏第1—22行、第9栏第4—14行、第39—42行、图2)：根据实际在线测量数据，通过网络连接到应用服务器，提供给仿真过程（相当于权利要求48中的连接到处理器的互联资源的网络，互联资源的网络被配置为帮助处理器执行第一原理仿真模型和执行第一原理仿真中的至少一个），其公开了权利要求48的附加技术特征。因此在权利要求48引用的权利要求28不具备创造性的情况下，权利要求48要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

49、权利要求49不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第1栏第55—58行、第3栏第48—57行、第4

栏第55—67行、第5栏第1—67行、第7栏第1—22行、第9栏第4—14行、第39—42行、图2)：根据实际在线测量数据，例如方向数据通过连接到应用服务器的网络、或者通过制造控制系统的远程访问通道、或者通过制造控制系统提供给仿真过程，隐含公开了互连资源的网络被配置为与处理器的代码并行化来分摊第一原理仿真的计算负荷。因此在权利要求49引用的权利要求48不具备创造性的情况下，权利要求49要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

50、权利要求50不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第1栏第55—58行、第3栏第48—57行、第4栏第55—67行、第5栏第1—67行、第7栏第1—22行、第9栏第4—14行、第39—42行、图2)：根据实际在线测量数据，例如方向数据通过连接到应用服务器的网络、或者通过制造控制系统的远程访问通道、或者通过制造控制系统提供给仿真过程，隐含公开了互连资源的网络被配置为与处理器共享仿真信息以辅助半导体处理工具所执行的处理。因此在权利要求50引用的权利要求48不具备创造性的情况下，权利要求50要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

51、权利要求51不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第1栏第55—58行、第3栏第48—57行、第4栏第55—67行、第5栏第1—67行、第7栏第1—22行、第9栏第4—14行、第39—42行、图2)：根据实际在线测量数据，例如方向数据通过连接到应用服务器的网络、或者通过制造控制系统的远程访问通道、或者通过制造控制系统提供给仿真过程，隐含公开了互连资源的网络被配置为将仿真结果分发到处理器，以减少基本类似的第一原理仿真的冗余执行。因此在权利要求51引用的权利要求50不具备创造性的情况下，权利要求51要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

52、权利要求52不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第1栏第55—58行、第3栏第48—57行、第4栏第55—67行、第5栏第1—67行、第7栏第1—22行、第9栏第4—14行、第39—42行、图2)：根据实际在线测量数据，例如方向数据通过连接到应用服务器的网络、或者通过制造控制系统的远程访问通道、或者通过制造控制系统提供给仿真过程，隐含公开了互连资源的网络被配置为将模型改变分发到处理器，以减少对第一原理仿真的冗余执行。因此在权利要求52引用的权利要求50不具备创造性的情况下，权利要求52要求

保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

53、权利要求53不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第1栏第55—58行、第3栏第48—57行、第4栏第55—67行、第5栏第1—67行、第7栏第1—22行、第9栏第4—14行、第39—42行、图2)：根据实际在线测量数据，例如方向数据通过网络像TCP/IP连接到应用服务器，提供给仿真过程(相当于权利要求53中的经由广域网连接到处理器的远程资源，远程资源被配置为辅助半导体处理工具所执行的半导体处理)，其公开了权利要求53的附加技术特征。因此在权利要求53引用的权利要求48不具备创造性的情况下，权利要求53要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

54、权利要求54不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第1栏第55—58行、第3栏第48—57行、第4栏第55—67行、第5栏第1—67行、第7栏第1—22行、第9栏第4—14行、第39—42行、图2)：根据实际在线测量数据，通过网络像TCP/IP连接到应用服务器，提供给仿真过程(相当于权利要求54中的远程资源包括计算和存储资源中的至少一种)。因此在权利要求54引用的权利要求53不具备创造性的情况下，权利要求54要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

55、权利要求55不具备专利法第二十二条第三款规定的创造性。权利要求55请求保护一种用于辅助半导体处理工具所执行的处理的系统。对比文件1(US5719796A)公开了一种半导体制造过程的统计仿真方法和系统，并具体公开了以下技术特征(参见对比文件1的说明书第3栏第48—57行，第4栏第55—67行，第5栏第1—67行，第6栏第34—44行，第7栏第1—55行，第9栏第4—14行，第39—42行、图2)：制造设备210(相当于权利要求55中的半导体处理工具)；通过测试设备获取处理参数(相当于权利要求55中的用于输入与所述半导体处理工具所执行的处理有关的数据的装置)；仿真系统的两个过程包括两种不同的操作运行模式，输入数据可以以若干种形式被应用，输入数据在实际处理之前被转换成统计分布函数，每一次单个的仿真根据相应的物理或设备模型处理输入数据(相当于权利要求55中的用于输入与所述半导体处理工具所执行的处理有关的第一原理仿真器，以提供与所述半导体处理工具所执行的处理有关的虚拟传感器测量)；仿真器根据参数和概率密度函数模型进行仿真，生成结果；根据得到的结果反馈到制作过程(相当于权利要求55中的用于使用所述虚拟传感器测量来辅助所述半导体处理工具所执行的处理的装置)。

权利要求55请求保护的技术方案与对比文件1所公开的内容相比，其区别仅在于名称和表述上的不同，而这种名称和表述上的差异是本领域技术人员容易想到的。因此在对比文件1的基础上结合本领域的公知常识从而得到权利要求55请求保护的技术方案，对本领域技术人员来说是显而易见的，因此权利要求55要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

56、权利要求56不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第3栏第48—57行，第4栏第55—67行，第5栏第1—67行，第7栏第1—22行，第9栏第4—14行、图2)：实际的在线过程和仿真过程都是自动的、并发执行（相当于权利要求56中的第一原理仿真装置包括与所述半导体处理工具所执行的处理并行地执行第一原理仿真的装置），其公开了权利要求56的附加技术特征。因此在权利要求56引用的权利要求55不具备创造性的情况下，权利要求56要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

57、权利要求57不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第3栏第55—57行，第4栏第47—67行，第5栏第1—67行)：校准处理的结果被进行比较，测量参数根据比较结果进行更新，仿真处理根据这些特定的处理参数进行（相当于权利要求57中的用于在半导体处理期间反复地更新来自所述物理传感器或度量工具的数据的装置，用于在半导体处理期间反复地使用更新后的数据执行第一原理仿真的装置）；校准处理包括与实际测量相应的仿真步骤，实际的在线过程和仿真过程都是自动的、并发执行（相当于权利要求57中的用于基于半导体处理期间获得的虚拟传感器测量，与运行半导体处理并行地辅助半导体处理的装置），其公开了权利要求57的附加技术特征。因此在权利要求57引用的权利要求56不具备创造性的情况下，权利要求57要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

58、权利要求58不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第1栏第55—58行、第3栏第48—57行、第4栏第55—67行、第5栏第1—67行、第7栏第1—22行、第9栏第4—14行、第39—42行、图2)：WET数据包括各种设备电子参数包括电压极限值和最大跨导等（相当于权利要求58中的用于在半导体处理开始之前设置用于第一原理仿真的边界条件的装置）；校准处理包括与实际测量相应的仿真步骤，实际的在线过程和仿真过程都是自动的、并发执行（相当于权利要求58中的用于基于半导体处理期间获得的虚拟传感器测量与运

行半导体处理并行地辅助半导体处理的装置)；而可以在半导体处理期间并且没有来自半导体处理器的直接输入的情况下，用装置执行对半导体处理的时间相关仿真，这种技术手段的应用是本领域技术人员容易想到的，因此在权利要求58引用的权利要求56不具备创造性的情况下，权利要求58要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

59、权利要求59不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第7栏第61—64行，第8栏第4—8行)：校准处理结果与实际测量参数进行比较(相当于权利要求59中的用于将虚拟传感器测量与实际传感器测量进行比较的装置)；基于数据比较步骤决定是否使用仿真或实际数据来改变仿真数据(相当于权利要求59中的用于细化最佳已知输入参数和物理模型中的至少一个，以获得虚拟传感器测量与实际传感器测量之间更好的一致的装置)；其公开了权利要求59的附加技术特征。因此在权利要求59引用的权利要求55不具备创造性的情况下，权利要求59要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

60、权利要求60不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第1栏第55—58行、第3栏第48—57行、第4栏第55—67行、第5栏第1—67行、第7栏第1—22行、第9栏第4—14行、第39—42行、图2)：根据实际在线测量数据，例如方向数据通过连接到应用服务器的网络、或者通过制造控制系统的远程访问通道、或者通过制造控制系统提供给仿真过程，隐含公开了用于分摊第一原理仿真的计算负荷的装置。因此在权利要求60引用的权利要求55不具备创造性的情况下，权利要求60要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

61、权利要求61不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第1栏第55—58行、第3栏第48—57行、第4栏第55—67行、第5栏第1—67行、第7栏第1—22行、第9栏第4—14行、第39—42行、图2)：根据实际在线测量数据，例如方向数据通过连接到应用服务器的网络、或者通过制造控制系统的远程访问通道、或者通过制造控制系统提供给仿真过程，隐含公开了用于在互连资源之间共享仿真信息以辅助半导体处理工具所执行的处理的装置。因此在权利要求61引用的权利要求41不具备创造性的情况下，权利要求61要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

63、权利要求63不具备专利法第二十二条第三款规定的创造性。权利要求63请求保护一种辅助半导体处理工具所执行的处理的方法。对比文件1(US5719796A)公开了一种半导体制造过程的统计仿真方法和系统,并具体公开了以下技术特征(参见对比文件1的说明书第3栏第48—57行,第4栏第55—67行,第5栏第1—67行,第6栏第34—44行,第7栏第1—55行,第9栏第4—14行,第39—42行、图2):制造设备210(相当于权利要求63中的半导体处理工具);通过测试设备获取处理参数(相当于权利要求63中的输入与所述半导体处理工具所执行的处理有关的数据);仿真系统的两个过程包括两种不同的操作运行模式,输入数据可以以若干种形式被应用,输入数据在实际处理之前被转换成统计分布函数,每一次单个的仿真根据相应的物理或设备模型处理输入数据(相当于权利要求63中的输入与所述半导体处理工具有关的第一原理物理模型);仿真器根据参数和概率密度函数模型进行仿真,生成结果;根据得到的结果反馈到制作过程(相当于权利要求63中的使用所述输入数据和所述物理模型来执行第一原理仿真,以提供用于所述半导体处理工具所执行的处理的仿真结果,使用所述仿真结果作为表征半导体处理工具所执行的处理的数据集合的一部分)。

权利要求63请求保护的技术方案与对比文件1所公开的内容相比,其区别仅在于名称和表述上的不同,而这种名称和表述上的差异是本领域技术人员容易想到的。因此,在对比文件1的基础上结合本领域的公知常识从而得到权利要求1请求保护的技术方案,对本领域技术人员来说是显而易见的,因此权利要求63要求保护的技术方案不具备突出的实质性特点和显著的进步,因而不具备创造性。

64、基于分别与权利要求2—8, 10, 13, 20—27相同的评述理由,权利要求64—67, 69—71, 73, 76—84要求保护的技术方案也不具备突出的实质性特点和显著的进步,因而不具备专利法第二十二条第三款规定的创造性。

65、权利要求68不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第3栏第48—57行,第4栏第55—67行,第5栏第1—67行,第7栏第1—22行,第9栏第4—14行、图2):测试设备包括残余气体分析器、光谱分析器等在现有制造领域已知的类似数据获取工具,WET数据或在线参数包含在已有数据表中,将它们代替计算的值(相当于权利要求63中的所述输入操作包括输入与所述半导体处理工具所执行的处理有关的数据),而用上述数据作为来自仿真模块的虚拟传感器数据是本领域技术人员容易想到的。因此在权利要求68引用的权利要求63不具备创造性的情况下,权利要求68要求保护的技术方案不具备突出的实质性特

点和显著的进步，因而不具备创造性。

66、权利要求72不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第3栏第48—57行，第4栏第55—67行，第5栏第1—67行，第7栏第1—22行，第9栏第4—14行、图2)：输入数据可以以若干种形式被应用，输入数据在实际处理之前被转换成统计分布函数(相当于权利要求72中的输入第一原理物理模型包括输入执行第一原理仿真以获得仿真结果所需的基本等式)；仿真器根据参数和概率密度函数模型进行仿真，生成结果，根据得到的结果反馈到制作过程(相当于权利要求72中的仿真结果可形成表征半导体处理工具所执行的处理的数据集合的一部分)；其公开了权利要求72的附加技术特征。因此在权利要求72引用的权利要求63不具备创造性的情况下，权利要求72要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

67、权利要求74不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第3栏第48—57行，第4栏第55—67行，第5栏第1—67行，第7栏第1—22行，第9栏第4—14行、图2)：校准处理结果与实际测量参数进行比较，基于数据比较步骤决定是否使用仿真或实际数据来改变仿真数据，实际的在线过程和仿真过程都是自动的、并发执行(相当于权利要求74中的执行第一原理仿真以提供仿真结果，仿真结果是通过半导体处理工具所执行的并发处理所测试的参数变化)；其公开了权利要求74的附加技术特征。因此在权利要求74引用的权利要求73不具备创造性的情况下，权利要求74要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

68、权利要求75不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第3栏第55—57行，第4栏第47—67行，第5栏第1—67行)：校准处理的结果被进行比较，测量参数根据比较结果进行更新，仿真处理根据这些特定的处理参数进行，实际的在线过程和仿真过程都是自动的、并发执行(相当于权利要求75中的执行第一原理仿真以提供仿真结果，仿真结果通过半导体处理工具所执行的并发处理所测试的参数不同的参数有关)，其公开了权利要求75的附加技术特征。因此在权利要求75引用的权利要求73不具备创造性的情况下，权利要求75要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

69、权利要求85不具备专利法第二十二条第三款规定的创造性。权利要求85请求

保护一种系统。对比文件1(US5719796A)公开了一种半导体制造过程的统计仿真方法和系统，并具体公开了以下技术特征(参见对比文件1的说明书第3栏第48—57行，第4栏第55—67行，第5栏第1—67行，第6栏第34—44行，第7栏第1—55行，第9栏第4—14行，第39—42行、图2)：制造设备210(相当于权利要求85中的半导体处理工具)；通过测试设备获取处理参数(相当于权利要求85中的被配置为输入与所述半导体处理工具所执行的处理有关的数据的输入设备)；仿真系统的两个过程包括两种不同的操作运行模式，输入数据可以以若干种形式被应用，输入数据在实际处理之前被转换成统计分布函数，每一次单个的仿真根据相应的物理或设备模型处理输入数据(相当于权利要求85中的第一原理仿真器，输入与所述半导体处理工具有关的第一原理物理模型)；仿真器根据参数和概率密度函数模型进行仿真，生成结果；根据得到的结果反馈到制作过程(相当于权利要求85中的使用所述输入数据和所述物理模型来执行第一原理仿真，以提供用于所述半导体处理工具所执行的处理的第一原理仿真结果，仿真结果被用作为表征半导体处理工具所执行的处理的数据集合的一部分)。

权利要求85请求保护的技术方案与对比文件1所公开的内容相比，其区别仅在于名称和表述上的不同，而这种名称和表述上的差异是本领域技术人员容易想到的。因此在对比文件1的基础上结合本领域的公知常识从而得到权利要求85请求保护的技术方案，对本领域技术人员来说是显而易见的，因此权利要求85要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

70、基于分别与权利要求29—35，37，40，47—54相同的评述理由，权利要求86—89，91—93，95，98—106要求保护的技术方案也不具备突出的实质性特点和显著的进步，因而不具备专利法第二十二条第三款规定的创造性。

71、权利要求90不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第3栏第48—57行，第4栏第55—67行，第5栏第1—67行，第7栏第1—22行，第9栏第4—14行、图2)：测试设备包括残余气体分析器、光谱分析器等在现有制造领域已知的类似数据获取工具，WET数据或在线参数包含在已有数据表中，将它们代替计算的值(相当于权利要求90中的输入设备被配置为输入与所述半导体处理工具所执行的处理有关的数据)，而用上述数据作为来自仿真模块的虚拟传感器数据是本领域技术人员容易想到的。因此在权利要求90引用的权利要求85不具备创造性的情况下，权利要求90要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。



72、权利要求94不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第3栏第48—57行,第4栏第55—67行,第5栏第1—67行,第7栏第1—22行,第9栏第4—14行、图2):输入数据可以以若干种形式被应用,输入数据在实际处理之前被转换成统计分布函数(相当于权利要求94中的处理器被配置为输入包括执行第一原理仿真以获得仿真结果所需的基本等式的第一原物理模型);仿真器根据参数和概率密度函数模型进行仿真,生成结果,根据得到的结果反馈到制作过程(相当于权利要求94中的仿真结果可形成表征半导体处理工具所执行的处理的数据集合的一部分);其公开了权利要求94的附加技术特征。因此在权利要求94引用的权利要求85不具备创造性的情况下,权利要求94要求保护的技术方案不具备突出的实质性特点和显著的进步,因而不具备创造性。

73、权利要求96不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第3栏第48—57行,第4栏第55—67行,第5栏第1—67行,第7栏第1—22行,第9栏第4—14行、图2):校准处理结果与实际测量参数进行比较,基于数据比较步骤决定是否使用仿真或实际数据来改变仿真数据,实际的在线过程和仿真过程都是自动的、并发执行(相当于权利要求96中的处理器被配置为执行第一原理仿真以提供仿真结果,仿真结果是通过半导体处理工具所执行的并发处理所测试的参数变化);其公开了权利要求96的附加技术特征。因此在权利要求96引用的权利要求95不具备创造性的情况下,权利要求96要求保护的技术方案不具备突出的实质性特点和显著的进步,因而不具备创造性。

74、权利要求97不具备专利法第二十二条第三款规定的创造性。对比文件1具体公开了以下技术特征(参见对比文件1的说明书第3栏第55—57行,第4栏第47—67行,第5栏第1—67行):校准处理的结果被进行比较,测量参数根据比较结果进行更新,仿真处理根据这些特定的处理参数进行,实际的在线过程和仿真过程都是自动的、并发执行(相当于权利要求97中的处理器被配置为执行第一原理仿真以提供仿真结果,仿真结果与和通过半导体处理工具所执行的并发处理所测试的参数不同的参数有关),其公开了权利要求97的附加技术特征。因此在权利要求97引用的权利要求95不具备创造性的情况下,权利要求97要求保护的技术方案不具备突出的实质性特点和显著的进步,因而不具备创造性。

75、权利要求107不具备专利法第二十二条第三款规定的创造性。权利要求107请求保护一种用于辅助半导体处理工具所执行的处理的系统。对比文件1(US5719796A)公

开了一种半导体制造过程的统计仿真方法和系统，并具体公开了以下技术特征（参见对比文件1的说明书第3栏第48—57行，第4栏第55—67行，第5栏第1—67行，第6栏第34—44行，第7栏第1—55行，第9栏第4—14行，第39—42行、图2）：制造设备210（相当于权利要求107中的半导体处理工具）；通过测试设备获取处理参数（相当于权利要求107中的用于输入与所述半导体处理工具所执行的处理有关的数据的装置）；仿真系统的两个过程包括两种不同的操作运行模式，输入数据可以以若干种形式被应用，输入数据在实际处理之前被转换成统计分布函数，每一次单个的仿真根据相应的物理或设备模型处理输入数据（相当于权利要求107中的用于输入与所述半导体处理工具有关的第一原理物理模型的装置，用于使用输入数据和物理模型来执行第一原理仿真以提供用于半导体处理工具所执行的处理的仿真结果的装置）；仿真器根据参数和概率密度函数模型进行仿真，生成结果；根据得到的结果反馈到制作过程（相当于权利要求107中的用于使用所述仿真结果作为表征所述半导体处理工具所执行的处理的数据集合的一部分的装置）。

权利要求107请求保护的技术方案与对比文件1所公开的内容相比，其区别仅在于名称和表述上的不同，而这种名称和表述上的差异是本领域技术人员容易想到的。因此在对对比文件1的基础上结合本领域的公知常识从而得到权利要求107请求保护的技术方案，对本领域技术人员来说是显而易见的，因此权利要求107要求保护的技术方案不具备突出的实质性特点和显著的进步，因而不具备创造性。

76、权利要求62、110请求保护一种包括有在处理器上执行的程序指令的计算机可读介质，其实质是保护计算机可读介质里的程序指令，而对于计算机程序本身，无论以何种形式出现，都属于专利法第二十五条第一款第（二）项所述的智力活动的规则和方法的范围，因此不是中国专利法保护的客体。

基于上述理由，本申请因为独立权利要求1、28、55、63、85107以及它们的从属权利要求均不具备创造性，独立权利要求62、110属于智力活动的规则和方法的范围，不能被授予专利权，而且本申请的说明书中也没有记载其它任何可获得专利权的实质性内容，因而即使对申请文件进行修改，本申请也不具备被授予专利权的前景。如果申请人不能在本通知书规定的答复期限内提出具有说服力的理由，本申请将被驳回。

审查员：明媚

代码：A443





☒ The following references are cited in this office action:

Serial Number	Number or Title of the References	Publication Date (or Filing Date of a Conflicting Application)
1	US5719796A	1998-02-17

5. The conclusion of the examination:

☐ In regard to the description:

- ☐ The subject matter of the application is excluded from patentability under Article 5 of the Patent Law.
- ☐ The description does not conform to the provisions of Article 26, paragraph three, of the Patent Law.
- ☐ The abstract does not conform to the provisions of rule 24 of the Implementing Regulations of the Patent Law.
- ☐ The Description does not conform to the provisions of rule 18 of the Implementing Regulations of the Patent Law.

☒ In regard to the claims:

- ☐ Claims \_\_\_\_\_ do not have novelty required by Article 22, paragraph two, of the Patent Law.
- ☒ Claims 1-61, 63-109 do not have inventiveness required by Article 22, paragraph three, of the Patent Law.
- ☐ Claims \_\_\_\_\_ do not have practical applicability required by Article 22, paragraph four, of the Patent Law.
- ☒ Claim 62, 110 is excluded from patentability under Article 25 of the Patent Law.
- ☐ Claims \_\_\_\_\_ do not conform to the provisions of Article 2, paragraph 1, of the Implementing Regulations.
- ☐ Claims \_\_\_\_\_ do not conform to the provisions of Rule 20 of the Implementing Regulations.
- ☐ Claims \_\_\_\_\_ do not conform to the provisions of Rule 21 of the Implementing Regulations.
- ☐ Claims \_\_\_\_\_ do not conform to the provisions of Rule 23 of the Implementing Regulations.

The analysis of above conclusion is given in the text of this office action.

6. In view of above conclusion, the examiner holds that:

- ☐ The applicant should amend the application according to the requirements in the text of this office action.
- ☐ The applicant should state his reason why the application can be approved and should amend the application to meet the requirements in the text of this office action, otherwise the application will be rejected.
- ☒ There are no substantial contents in the application which can be patented, and if the applicant fails to state his reason or if the reason is insufficient, the application will be rejected.

7. The applicant should note that:

- (1) In accordance with the provisions of Article 37 of the Patent Law, the applicant shall submit his observations within **FOUR** months from the date of receipt of this office action. If the applicant, without any justified reason, fails to make a response within the time limit, the application will be deemed to have been withdrawn.
- (2) The amendment to the application shall conform to the provisions of Article 33 of the Patent Law, the amended documents shall be furnished in duplicate, and the form of the amended documents shall conform to the relevant provisions of the Guidelines for Examination.
- (3) The applicant's observations and /or the amended documents shall be mailed or sent by hand to the Receiving Department of the Chinese Patent Office. Any documents which are not sent to the Receiving Department have no legal effects.
- (4) The applicant and/or his attorney shall not go to the Chinese Patent Office to meet the examiner without making an appointment.

8. The text of this office action includes 23 pages, along with the following enclosures:

☒ 1 copy of the cited references in a total of 6 pages.

☐

Electronics Examination Department

Examiner: Mei MING(A443)

Date of decision: 2007.8.21

## TEXT OF THE FIRST OFFICE ACTION

Application No.200480028518.0

The application claims a system and method for on-tool semiconductor simulation. After examination, the examiner gives the opinions as follows:

1. Claim 1 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of *the Chinese Patent Law*. Claim 1 claims a method of facilitating a process performed by a semiconductor processing tool. Reference 1 (US5719796A) discloses a method and system for a statistical simulation of a semiconductor fabrication process, and in particular, the following technical features (see Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 6, Lines 34-44; Column 7, Lines 1-55; Column 9, Lines 4-14 and Lines 39-42 of the specification and Fig.2): fabrication equipment 210 (corresponding to the semiconductor processing tool in claim 1); acquiring process parameters by using test equipment (corresponding to inputting data relating to a process performed by the semiconductor processing tool in claim 1); two-run process of the simulation system including two different run modes of operation; input data being applied in several formats, but converted into a statistical distribution function before actual processing begins; each single simulation processing the input data in accordance with a corresponding physical or device model (corresponding to inputting a first principles physical model relating to the semiconductor processing tool in claim 1); the simulator performing the simulation according to input parameters and a probability density function model, and generating an output; results of the simulation being fed back to the fabrication process (corresponding to performing first principles simulation using the input data and the physical model to provide a virtual sensor measurement relating to the process performed by the semiconductor processing tool; and using the virtual sensor measurement to facilitate the process performed by the semiconductor processing tool in claim 1).

As can be seen, the technical solution claimed by claim 1 differs from the content disclosed in Reference 1 just in their titles and expressions, which is easily conceived by those skilled in the art. So it is obvious for those skilled in the art to combine common sense in the art with Reference 1 to obtain the technical solution claimed by claim 1. Therefore, the technical solution claimed by claim 1 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness.

2. Claim 2 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of *the Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 of the specification and Fig.2): test equipment includes residual gas analyzers, spectral analyzers and similar data

acquisition tools that are known in the art of manufacturing; the test equipment may be physically mounted on the fabrication equipment; at several stages of the fabrication process, process parameters are acquired using the test equipment (corresponding to the content in claim 2: said inputting comprises directly inputting the data relating to a process performed by the semiconductor processing tool from at least one of a physical sensor and a metrology tool physically mounted on the semiconductor processing tool). Reference 1 discloses the additional technical features of claim 2. Therefore, given that claim 1 to which claim 2 refers does not possess inventiveness, the technical solution claimed by claim 2 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

3. Claim 3 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of *the Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 of the specification and Fig.2): test equipment includes residual gas analyzers, spectral analyzers and similar data acquisition tools that are known in the art of manufacturing, wherein the similar data acquisition tools that are known in the art of manufacturing necessarily includes a manual input device; if any WET data or in-line parameter is contained in the existing dataset, these WET data or in-line parameters replace computed values (corresponding to the content in claim 3: said inputting comprises indirectly inputting the data relating to a process performed by the semiconductor processing tool from at least one of a manual input device and a database). Reference 1 discloses the additional technical features of claim 3. Therefore, given that claim 1 to which claim 3 refers does not possess inventiveness, the technical solution claimed by claim 3 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

4. Claim 4 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of *the Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 of the specification and Fig.2): a simulation run uses input parameters that may be derived from actual in-line measured data (corresponding to the content in claim 4: said indirectly inputting comprises inputting data recorded from a process previously performed by the semiconductor processing tool). Reference 1 discloses the additional technical features of claim 4. Therefore, given that claim 3 to which claim 4 refers does not possess inventiveness, the technical solution claimed by claim 4 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

5. Claim 5 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of *the Chinese Patent Law*. Reference 1 discloses the following technical features in

particular (see Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 of the specification and Fig.2): particular process parameters are specified independently (corresponding to the content in claim 5: said indirectly inputting comprises inputting data set by a simulation operator). Reference 1 discloses the additional technical features of claim 5. Therefore, given that claim 3 to which claim 5 refers does not possess inventiveness, the technical solution claimed by claim 5 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

6. Claim 6 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of *the Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 of the specification and Fig.2): test equipment includes residual gas analyzers, spectral analyzers and similar data acquisition tools that are known in the art of manufacturing (corresponding to the content in claim 6: said inputting data comprises inputting data relating to at least one of the physical characteristics of the semiconductor processing tool and the semiconductor tool environment). Reference 1 discloses the additional technical features of claim 6. Therefore, given that claim 1 to which claim 6 refers does not possess inventiveness, the technical solution claimed by claim 6 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

7. Claim 7 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of *the Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 of the specification and Fig.2): a simulation run uses input parameters that may be derived from actual in-line measured data (corresponding to the content in claim 7: said inputting data comprises inputting data relating to at least one of a characteristic and a result of a process performed by the semiconductor processing tool). Reference 1 discloses the additional technical features of claim 7. Therefore, given that claim 1 to which claim 7 refers does not possess inventiveness, the technical solution claimed by claim 7 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

8. Claim 8 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of *the Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 of the specification and Fig.2): input data may be applied in several formats, but is converted into a statistical distribution function before actual processing begins (corresponding to the content in claim 8: said inputting a first principles physical model comprises inputting a spatially resolved

model of the geometry of the semiconductor processing tool). Reference 1 discloses the additional technical features of claim 8. Therefore, given that claim 1 to which claim 8 refers does not possess inventiveness, the technical solution claimed by claim 8 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

9. Claim 9 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of *the Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 of the specification and Fig.2): input data may be applied in several formats, but is converted into a statistical distribution function before actual processing begins (corresponding to the content in claim 9: said inputting a first principles physical model comprises inputting fundamental equations necessary to perform first principles simulation to obtain a virtual sensor reading). Reference 1 discloses the additional technical features of claim 9. Therefore, given that claim 1 to which claim 9 refers does not possess inventiveness, the technical solution claimed by claim 9 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

10. Claim 10 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of *the Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 of the specification and Fig.2): the actual in-line process and the simulation process are completely automatic, being performed in parallel (corresponding to the content in claim 10: said performing first principles simulation comprises performing first principles simulation concurrently with the process performed by the semiconductor processing tool). Reference 1 discloses the additional technical features of claim 10. Therefore, given that claim 1 to which claim 10 refers does not possess inventiveness, the technical solution claimed by claim 10 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

11. Claim 11 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of *the Chinese Patent Law*. Reference 1 discloses the following technical features (see Column 3, Lines 55-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 of the specification and Fig.2): results of calibration runs are compared and parameters are updated as a result of these comparisons; the simulation is performed using these specific process parameters (corresponding to repeatedly updating the data from the physical sensor or metrology tool during the semiconductor process; performing the first principles simulation using the updated data in claim 11); the calibration run includes a series of simulation steps, each with corresponding actual measurements; the actual in-line process and the simulation process are completely automatic, being performed in parallel (corresponding to facilitating the semiconductor process concurrently with running



the semiconductor process based on virtual sensor measurements obtained during the semiconductor process in claim 11). Reference 1 discloses the additional technical features of claim 11. Therefore, given that claim 10 to which claim 11 refers does not possess inventiveness, the technical solution claimed by claim 11 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

12. Claim 12 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 1, Lines 55-58; Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 and Lines 39-42 of the specification and Fig.2): WET data includes electrical parameter measurements such as threshold voltage ( $V_{th}$ ) and maximum transconductance ( $G_m$ ) (corresponding to setting boundary conditions for the first principles simulation prior to a start of the semiconductor process in claim 12); the calibration run includes a series of simulation steps, each with corresponding actual measurements; the actual in-line process and the simulation process are completely automatic, being performed in parallel (corresponding to facilitating the semiconductor process concurrently with running the semiconductor process based on virtual sensor measurements obtained during the semiconductor process in claim 12). In addition, the technical means of performing a time dependent simulation of the semiconductor process during the semiconductor process and without direct input from the semiconductor process is easily conceived by those skilled in the art. Therefore, given that claim 10 to which claim 12 refers does not possess inventiveness, the technical solution claimed by claim 12 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

13. Claim 13 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 1, Lines 55-58; Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 of the specification and Fig.2): the actual in-line process and the simulation process are performed independently (corresponding to the content in claim 13: said performing first principles simulation comprises performing first principles simulation not concurrently with the process performed by the semiconductor processing tool). Reference 1 discloses the additional technical features of claim 13. Therefore, given that claim 1 to which claim 13 refers does not possess inventiveness, the technical solution claimed by claim 13 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

14. Claim 14 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 1, Lines 55-58; Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 and Lines

39-42 of the specification and Fig.2): the simulator performs the simulation according to input parameters; WET data includes electrical parameter measurements such as threshold voltage ( $V_{th}$ ) and maximum transconductance ( $G_m$ ) (corresponding to the content in claim 14: said inputting data comprises inputting at least one of initial and boundary conditions of said first principles simulation recorded from a process previously performed). Reference 1 discloses the additional technical features of claim 14. Therefore, given that claim 13 to which claim 14 refers does not possess inventiveness, the technical solution claimed by claim 14 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

15. Claim 15 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 1, Lines 55-58; Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 and Lines 39-42 of the specification and Fig.2): the simulator performs the simulation according to input parameters (corresponding to the content in claim 15: said indirectly inputting comprises inputting best known input parameters for the physical model). Reference 1 discloses the additional technical features of claim 15. Therefore, given that claim 3 to which claim 15 refers does not possess inventiveness, the technical solution claimed by claim 15 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

16. Claim 16 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 7, Lines 61-64; Column 8, Lines 4-8 of the specification): results of calibration runs are compared with the actual measured parameters; (corresponding to comparing said virtual sensor measurements with actual sensor measurements in claim 16); a determine matching process to convert step determines whether to convert simulated profile data using previous simulated data or actual data on the basis of the difference profile determined by the data comparison step (corresponding to refining at least one of the best known input parameters and the physical model to obtain better agreement between the virtual sensor measurements with actual sensor measurements in claim 16). Reference 1 discloses the additional technical features of claim 16. Therefore, given that claim 15 to which claim 16 refers does not possess inventiveness, the technical solution claimed by claim 16 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

17. Claim 17 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 1, Lines 55-58; Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 and Lines 39-42 of the specification and Fig.2): the simulator performs the simulation according

to input parameters and a probability density function model, and generates an output (corresponding to the content in claim 17: said using the virtual sensor measurement comprises using the virtual sensor measurement to characterize the process performed by the semiconductor processing tool). Reference 1 discloses the additional technical features of claim 17. Therefore, given that claim 1 to which claim 17 refers does not possess inventiveness, the technical solution claimed by claim 17 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

18. Claim 18 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 1, Lines 55-58; Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 and Lines 39-42 of the specification and Fig.2): the actual in-line measured data is measured and transferred to the simulation process through a manufacturing control system (corresponding to the content in claim 18: said using the virtual sensor measurement comprises using the virtual sensor measurement to control the process performed by the semiconductor processing tool). Reference 1 discloses the additional technical features of claim 18. Therefore, given that claim 1 to which claim 18 refers does not possess inventiveness, the technical solution claimed by claim 18 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

19. Claim 19 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 1, Lines 55-58; Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 and Lines 39-42 of the specification and Fig.2): simulation accuracy is improved according to simulation results while propagation error are reduced via the interaction between different simulation steps, and results of the simulation are fed back to the fabrication process, which corresponds to impliedly disclosing using the virtual sensor measurement to detect a fault in the process performed by the semiconductor processing tool. Therefore, given that claim 1 to which claim 19 refers does not possess inventiveness, the technical solution claimed by claim 19 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

20. Claim 20 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. The additional technical features of claim 20 are: storing the virtual sensor measurement in a library for subsequent use in a first principles simulation. However, storing data in a library for use in accordance with actual needs is easily conceived by those skilled in the art. Therefore, given that claim 1 to which claim 20 refers does not possess inventiveness, the technical solution claimed by claim 20 neither possesses prominent substantive features nor represents

any notable progress, and thus does not possess inventiveness either.

21. Claim 21 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 1, Lines 55-58; Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 and Lines 39-42 of the specification and Fig.2): the actual in-line measured data is measured and transferred to the simulation process through a network connection to the application server (corresponding to using a network of interconnected resources to perform the process steps in claim 21). Reference 1 discloses the additional technical features of claim 21. Therefore, given that claim 1 to which claim 21 refers does not possess inventiveness, the technical solution claimed by claim 21 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

22. Claim 22 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 1, Lines 55-58; Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 and Lines 39-42 of the specification and Fig.2): the actual in-line measured data, such as orientation data, is measured and transferred to the simulation process through a network connection to the application server, or the remote access channel of a manufacturing control system, or the manufacturing control system, which corresponds to impliedly disclosing using code parallelization among interconnected computational resources to share the computational load of the first principles simulation. Therefore, given that claim 21 to which claim 22 refers does not possess inventiveness, the technical solution claimed by claim 22 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

23. Claim 23 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 1, Lines 55-58; Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 and Lines 39-42 of the specification and Fig.2): the actual in-line measured data, such as orientation data, is measured and transferred to the simulation process through a network connection to the application server, or the remote access channel of a manufacturing control system, or the manufacturing control system, which corresponds to impliedly disclosing sharing simulation information among interconnected resources to control the process performed by the semiconductor processing tool. Therefore, given that claim 21 to which claim 23 refers does not possess inventiveness, the technical solution claimed by claim 23 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

24. Claim 24 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 1, Lines 55-58; Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 and Lines 39-42 of the specification and Fig.2): the actual in-line measured data, such as orientation data, is measured and transferred to the simulation process through a network connection to the application server, or the remote access channel of a manufacturing control system, or the manufacturing control system, which corresponds to impliedly disclosing distributing simulation results among the interconnected resources to reduce redundant execution of substantially similar first principles simulations by different resources. Therefore, given that claim 23 to which claim 24 refers does not possess inventiveness, the technical solution claimed by claim 24 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

25. Claim 25 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 1, Lines 55-58; Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 and Lines 39-42 of the specification and Fig.2): the actual in-line measured data, such as orientation data, is measured and transferred to the simulation process through a network connection to the application server, or the remote access channel of a manufacturing control system, or the manufacturing control system, which corresponds to impliedly disclosing distributing model changes among the interconnected resources to reduce redundant refinements of first principles simulations by different resources. Therefore, given that claim 23 to which claim 25 refers does not possess inventiveness, the technical solution claimed by claim 25 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

26. Claim 26 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 1, Lines 55-58; Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 and Lines 39-42 of the specification and Fig.2): the actual in-line measured data, such as orientation data, is measured and transferred to the simulation process through a network connection to the application server, such as TCP/IP (corresponding to using remote resources via a wide area network to facilitate the semiconductor process performed by the semiconductor processing tool in claim 26). Reference 1 discloses the additional technical features of claim 26. Therefore, given that claim 21 to which claim 26 refers does not possess inventiveness, the technical solution claimed by claim 26 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

27. Claim 27 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 1, Lines 55-58; Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 and Lines 39-42 of the specification and Fig.2): the actual in-line measured data is measured and transferred to the simulation process through a network connection to the application server, such as TCP/IP (corresponding to using at least one of remote computational and storage resources via a wide area network to facilitate the semiconductor process performed by the semiconductor processing tool in claim 27). Therefore, given that claim 26 to which claim 27 refers does not possess inventiveness, the technical solution claimed by claim 27 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

28. Claim 28 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Claim 28 claims a system for facilitating a process performed by a semiconductor processing tool. Reference 1 (US5719796A) discloses a method and system for a statistical simulation of a semiconductor fabrication process, and in particular, the following technical features (see Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 6, Lines 34-44; Column 7, Lines 1-55; Column 9, Lines 4-14 and Lines 39-42 of the specification and Fig.2): fabrication equipment 210 (corresponding to the semiconductor processing tool in claim 28); acquiring process parameters by using test equipment (corresponding to the input device configured to input data relating to the process performed by the semiconductor processing tool in claim 28); two-run process of the simulation system including two different run modes of operation; input data being applied in several formats, but converted into a statistical distribution function before actual processing begins; each single simulation processing the input data in accordance with a corresponding physical or device model (corresponding to the first principles simulation processor configured to input a first principles physical model relating to the semiconductor processing tool in claim 28); the simulator performing the simulation according to input parameters and a probability density function model, and generating an output; results of the simulation being fed back to the fabrication process (corresponding to performing first principles simulation using the input data and the physical model to provide a virtual sensor measurement relating to the process performed by the semiconductor processing tool, wherein the virtual sensor measurement is used to facilitate the process performed by the semiconductor processing tool in claim 28).

As can be seen, the technical solution claimed by claim 28 differs from the content disclosed in Reference 1 just in their titles and expressions, which is easily conceived by those skilled in the art. So it is obvious for those skilled in the art to combine common sense in the art with Reference 1 to obtain the technical solution claimed by claim 28. Therefore, the technical solution claimed by claim 28 neither possesses prominent substantive features nor represents any notable progress, and thus does not

possess inventiveness.

29. Claim 29 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 of the specification and Fig.2): test equipment includes residual gas analyzers, spectral analyzers and similar data acquisition tools that are known in the art of manufacturing; the test equipment may be physically installed on the fabrication equipment; at several stages of the fabrication process, process parameters are acquired using the test equipment (corresponding to the content in claim 29: said input device comprises at least one of a physical sensor and a metrology tool physically mounted on the semiconductor processing tool). Reference 1 discloses the additional technical features of claim 29. Therefore, given that claim 28 to which claim 29 refers does not possess inventiveness, the technical solution claimed by claim 29 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

30. Claim 30 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 and of the specification and Fig.2): test equipment includes residual gas analyzers, spectral analyzers and similar data acquisition tools that are known in the art of manufacturing, wherein the similar data acquisition tools that are known in the art of manufacturing necessarily includes a manual input device; if any WET data or in-line parameter is contained in the existing dataset, these WET data or in-line parameters replace computed values (corresponding to said input device comprising at least one of a manual input device and a database in claim 30). Reference 1 discloses the additional technical features of claim 30. Therefore, given that claim 28 to which claim 30 refers does not possess inventiveness, the technical solution claimed by claim 30 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

31. Claim 31 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 and of the specification and Fig.2): a simulation run uses input parameters that may be derived from actual in-line measured data (corresponding to said input device being configured to input data recorded from a process previously performed by the semiconductor processing tool in claim 31). Reference 1 discloses the additional technical features of claim 31. Therefore, given that claim 30 to which claim 31 refers does not possess inventiveness, the technical solution claimed by claim 31 neither possesses prominent

substantive features nor represents any notable progress, and thus does not possess inventiveness either.

32. Claim 32 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of *the Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 of the specification and Fig.2): particular process parameters are specified independently (corresponding to said input device being configured to input data set by a simulation operator in claim 32). Reference 1 discloses the additional technical features of claim 32. Therefore, given that claim 30 to which claim 32 refers does not possess inventiveness, the technical solution claimed by claim 32 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

33. Claim 33 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of *the Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 of the specification and Fig.2): test equipment includes residual gas analyzers, spectral analyzers and similar data acquisition tools that are known in the art of manufacturing (corresponding to said input device being configured to input data relating to at least one of the physical characteristics of the semiconductor processing tool and the semiconductor tool environment). Reference 1 discloses the additional technical features of claim 33. Therefore, given that claim 28 to which claim 33 refers does not possess inventiveness, the technical solution claimed by claim 33 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

34. Claim 34 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of *the Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 of the specification and Fig.2): a simulation run uses input parameters that may be derived from actual in-line measured data (corresponding to said input device being configured to input data relating to at least one of a characteristic and a result of a process performed by the semiconductor processing tool in claim 34). Reference 1 discloses the additional technical features of claim 34. Therefore, given that claim 28 to which claim 34 refers does not possess inventiveness, the technical solution claimed by claim 34 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

35. Claim 35 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of *the Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67;



Column 7, Lines 1-22; Column 9, Lines 4-14 of the specification and Fig.2): input data may be applied in several formats, but is converted into a statistical distribution function before actual processing begins (corresponding to said processor being configured to input a first principles physical model comprising a spatially resolved model of the geometry of the semiconductor processing tool in claim 35). Reference 1 discloses the additional technical features of claim 35. Therefore, given that claim 28 to which claim 35 refers does not possess inventiveness, the technical solution claimed by claim 35 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

36. Claim 36 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 of the specification and Fig.2): input data may be applied in several formats, but is converted into a statistical distribution function before actual processing begins (corresponding to said processor being configured to input a first principles physical model comprising fundamental equations necessary to perform first principles simulation to obtain a virtual sensor reading in claim 36). Reference 1 discloses the additional technical features of claim 36. Therefore, given that claim 28 to which claim 36 refers does not possess inventiveness, the technical solution claimed by claim 36 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

37. Claim 37 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 of the specification and Fig.2): the actual in-line process and the simulation process are completely automatic, being performed in parallel (corresponding to said processor being configured to perform said first principles simulation concurrently with the process performed by the semiconductor processing tool in claim 37). Reference 1 discloses the additional technical features of claim 37. Therefore, given that claim 28 to which claim 37 refers does not possess inventiveness, the technical solution claimed by claim 37 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

38. Claim 38 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 3, Lines 55-57; Column 4, Lines 47-67; Column 5, Lines 1-67 of the specification): results of calibration runs are compared and parameters are updated as a result of these comparisons; the simulation is performed using these specific process parameters (corresponding to repeatedly updating the data from the physical sensor or metrology tool during the semiconductor process; and repeatedly

performing the first principles simulation using the updated data during the semiconductor process in claim 38); the calibration run includes a series of simulation steps, each with corresponding actual measurements; the actual in-line process and the simulation process are completely automatic, being performed in parallel (corresponding to facilitating the semiconductor process concurrently with running the semiconductor process based on virtual sensor measurements obtained during the semiconductor process in claim 38). Reference 1 discloses the additional technical features of claim 38. Therefore, given that claim 37 to which claim 38 refers does not possess inventiveness, the technical solution claimed by claim 38 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

39. Claim 39 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 1, Lines 55-58; Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 and Lines 39-42 of the specification and Fig.2): WET data includes electrical parameter measurements such as threshold voltage ( $V_{th}$ ) and maximum transconductance ( $G_m$ ) (corresponding to setting boundary conditions for the first principles simulation prior to a start of the semiconductor process in claim 39); the calibration run includes a series of simulation steps, each with corresponding actual measurements; the actual in-line process and the simulation process are completely automatic, being performed in parallel (corresponding to facilitating the semiconductor process concurrently with running the semiconductor process based on virtual sensor measurements obtained during the semiconductor process in claim 39). In addition, the technical means of performing a time dependent simulation of the semiconductor process during the semiconductor process and without direct input from the semiconductor process is easily conceived by those skilled in the art. Therefore, given that claim 37 to which claim 39 refers does not possess inventiveness, the technical solution claimed by claim 39 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

40. Claim 40 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 1, Lines 55-58; Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 of the specification and Fig.2): the actual in-line process and the simulation process are performed independently (corresponding to said processor being configured to perform said first principles simulation not concurrently with the process performed by the semiconductor processing tool in claim 40). Reference 1 discloses the additional technical features of claim 40. Therefore, given that claim 28 to which claim 40 refers does not possess inventiveness, the technical solution claimed by claim 40 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

41. Claim 41 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 1, Lines 55-58; Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 and Lines 39-42 of the specification and Fig.2): the simulator performs the simulation according to input parameters; WET data includes electrical parameter measurements such as threshold voltage ( $V_{th}$ ) and maximum transconductance ( $G_m$ ) (corresponding to said processor being configured to perform said first principles simulation at least by using the input data to set at least one of initial and boundary conditions of said first principles simulation recorded from a process previously performed in claim 41). Reference 1 discloses the additional technical features of claim 41. Therefore, given that claim 40 to which claim 41 refers does not possess inventiveness, the technical solution claimed by claim 41 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

42. Claim 42 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 1, Lines 55-58; Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 and Lines 39-42 of the specification and Fig.2): the simulator performs the simulation according to input parameters (corresponding to said input device being configured to input best known input parameters for the physical model in claim 42). Reference 1 discloses the additional technical features of claim 42. Therefore, given that claim 30 to which claim 42 refers does not possess inventiveness, the technical solution claimed by claim 42 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

43. Claim 43 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 7, Lines 61-64; Column 8, Lines 4-8 of the specification): results of calibration runs are compared with the actual measured parameters; (corresponding to comparing said virtual sensor measurements with actual sensor measurements in claim 43); a determine matching process to convert step determines whether to convert simulated profile data using previous simulated data or actual data on the basis of the difference profile determined by the data comparison step (corresponding to refining at least one of the best known input parameters and the physical model to obtain better agreement between the virtual sensor measurements with actual sensor measurements in claim 43). Reference 1 discloses the additional technical features of claim 43. Therefore, given that claim 42 to which claim 43 refers does not possess inventiveness, the technical solution claimed by claim 43 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

44. Claim 44 does not possess inventiveness as stipulated by Article 22, Paragraph 3

of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 1, Lines 55-58; Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 and Lines 39-42 of the specification and Fig.2): the simulator performs the simulation according to input parameters and a probability density function model, and generates an output (corresponding to said virtual sensor measurement being used to characterize the process performed by the semiconductor processing tool in claim 44). Reference 1 discloses the additional technical features of claim 44. Therefore, given that claim 28 to which claim 44 refers does not possess inventiveness, the technical solution claimed by claim 44 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

45. Claim 45 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 1, Lines 55-58; Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 and Lines 39-42 of the specification and Fig.2): the actual in-line measured data is measured and transferred to the simulation process through a manufacturing control system (corresponding to said virtual sensor measurement being used to control the process performed by the semiconductor processing tool in claim 45). Reference 1 discloses the additional technical features of claim 45. Therefore, given that claim 28 to which claim 45 refers does not possess inventiveness, the technical solution claimed by claim 45 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

46. Claim 46 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 1, Lines 55-58; Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 and Lines 39-42 of the specification and Fig.2): simulation accuracy is improved according to simulation results while propagation error are reduced via the interaction between different simulation steps, and results of the simulation are fed back to the fabrication process, which corresponds to impliedly disclosing using the virtual sensor measurement to detect a fault in the process performed by the semiconductor processing tool. Therefore, given that claim 28 to which claim 46 refers does not possess inventiveness, the technical solution claimed by claim 46 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

47. Claim 47 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. The additional technical features of claim 47 are: storing the virtual sensor measurement in a library for subsequent use in a first principles simulation. However, storing data in a library for use in accordance with actual needs is easily conceived by those skilled in the art. Therefore, given that claim 28

to which claim 47 refers does not possess inventiveness, the technical solution claimed by claim 47 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

48. Claim 48 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 1, Lines 55-58; Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 and Lines 39-42 of the specification and Fig.2): the actual in-line measured data is measured and transferred to the simulation process through a network connection to the application server (corresponding to the network of interconnected resources connected to said processor and configured to assist said processor in performing at least one of the inputting a first principles simulation model and performing a first principles simulation in claim 48). Reference 1 discloses the additional technical features of claim 48. Therefore, given that claim 28 to which claim 48 refers does not possess inventiveness, the technical solution claimed by claim 48 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

49. Claim 49 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 1, Lines 55-58; Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 and Lines 39-42 of the specification and Fig.2): the actual in-line measured data, such as orientation data, is measured and transferred to the simulation process through a network connection to the application server, or the remote access channel of a manufacturing control system, or the manufacturing control system, which corresponds to impliedly disclosing said network of interconnected resources being configured to use code parallelization with said processor to share the computational load of the first principles simulation. Therefore, given that claim 48 to which claim 49 refers does not possess inventiveness, the technical solution claimed by claim 49 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

50. Claim 50 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 1, Lines 55-58; Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 and Lines 39-42 of the specification and Fig.2): the actual in-line measured data, such as orientation data, is measured and transferred to the simulation process through a network connection to the application server, or the remote access channel of a manufacturing control system, or the manufacturing control system, which corresponds to impliedly disclosing said network of interconnected resources being configured to share simulation information with said processor to facilitate said

process performed by the semiconductor processing tool. Therefore, given that claim 48 to which claim 50 refers does not possess inventiveness, the technical solution claimed by claim 50 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

51. Claim 51 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 1, Lines 55-58; Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 and Lines 39-42 of the specification and Fig.2): the actual in-line measured data, such as orientation data, is measured and transferred to the simulation process through a network connection to the application server, or the remote access channel of a manufacturing control system, or the manufacturing control system, which corresponds to impliedly disclosing said network of interconnected resources being configured to distribute simulation results to said processor to reduce redundant execution of substantially similar first principles simulations. Therefore, given that claim 50 to which claim 51 refers does not possess inventiveness, the technical solution claimed by claim 51 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

52. Claim 52 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 1, Lines 55-58; Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 and Lines 39-42 of the specification and Fig.2): the actual in-line measured data, such as orientation data, is measured and transferred to the simulation process through a network connection to the application server, or the remote access channel of a manufacturing control system, or the manufacturing control system, which corresponds to impliedly disclosing said network of interconnected resources being configured to distribute model changes to said processor to reduce redundant refinements of first principles simulations. Therefore, given that claim 50 to which claim 52 refers does not possess inventiveness, the technical solution claimed by claim 52 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

53. Claim 53 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 1, Lines 55-58; Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 and Lines 39-42 of the specification and Fig.2): the actual in-line measured data, such as orientation data, is measured and transferred to the simulation process through a network connection to the application server, such as TCP/IP (corresponding to the remote resources connected to said processor via a wide area network and configured to facilitate the semiconductor process performed by the semiconductor processing

tool in claim 53). Reference 1 discloses the additional technical features of claim 53. Therefore, given that claim 48 to which claim 53 refers does not possess inventiveness, the technical solution claimed by claim 53 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

54. Claim 54 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 1, Lines 55-58; Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 and Lines 39-42 of the specification and Fig.2): the actual in-line measured data is measured and transferred to the simulation process through a network connection to the application server, such as TCP/IP (corresponding to said remote resources comprising at least one of a computational and a storage resource in claim 54). Therefore, given that claim 53 to which claim 54 refers does not possess inventiveness, the technical solution claimed by claim 54 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

55. Claim 55 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Claim 55 claims a system for facilitating a process performed by a semiconductor processing tool. Reference 1 (US5719796A) discloses a method and system for a statistical simulation of a semiconductor fabrication process, and in particular, the following technical features (see Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 6, Lines 34-44; Column 7, Lines 1-55; Column 9, Lines 4-14 and Lines 39-42 of the specification and Fig.2): fabrication equipment 210 (corresponding to the semiconductor processing tool in claim 55); acquiring process parameters by using test equipment (corresponding to the means for inputting data relating to a process performed by the semiconductor processing tool in claim 55); two-run process of the simulation system including two different run modes of operation; input data being applied in several formats, but converted into a statistical distribution function before actual processing begins; each single simulation processing the input data in accordance with a corresponding physical or device model (corresponding to inputting a first principles physical model relating to the semiconductor processing tool to provide a virtual sensor measurement relating to the process performed by the semiconductor processing tool in claim 55); the simulator performing the simulation according to input parameters and a probability density function model, and generating an output; results of the simulation being fed back to the fabrication process (corresponding to the means for using the virtual sensor measurement to facilitate the process performed by the semiconductor processing tool in claim 55).

As can be seen, the technical solution claimed by claim 55 differs from the content disclosed in Reference 1 just in their titles and expressions, which is easily conceived by those skilled in the art. So it is obvious for those skilled in the art to combine

common sense in the art with Reference 1 to obtain the technical solution claimed by claim 55. Therefore, the technical solution claimed by claim 55 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness.

56. Claim 56 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 of the specification and Fig.2): the actual in-line process and the simulation process are completely automatic, being performed in parallel (corresponding to the content in claim 56: said means for performing first principles simulation comprises means for performing first principles simulation concurrently with the process performed by the semiconductor processing tool). Reference 1 discloses the additional technical features of claim 56. Therefore, given that claim 55 to which claim 56 refers does not possess inventiveness, the technical solution claimed by claim 56 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

57. Claim 57 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 3, Lines 55-57; Column 4, Lines 47-67; Column 5, Lines 1-67 of the specification): results of calibration runs are compared and parameters are updated as a result of these comparisons; the simulation is performed using these specific process parameters (corresponding to the means for repeatedly updating the data from the physical sensor or metrology tool during the semiconductor process and the means for repeatedly performing the first principles simulation using the updated data during the semiconductor process in claim 57); the calibration run includes a series of simulation steps, each with corresponding actual measurements; the actual in-line process and the simulation process are completely automatic, being performed in parallel (corresponding to the means for facilitating the semiconductor process concurrently with running the semiconductor process based on virtual sensor measurements obtained during the semiconductor process in claim 57). Reference 1 discloses the additional technical features of claim 57. Therefore, given that claim 56 to which claim 57 refers does not possess inventiveness, the technical solution claimed by claim 57 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

58. Claim 58 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 1, Lines 55-58; Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 and Lines 39-42 of the specification and Fig.2): WET data includes electrical parameter measurements such as threshold voltage ( $V_{th}$ ) and maximum transconductance ( $G_m$ )



(corresponding to means for setting boundary conditions for the first principles simulation prior to a start of the semiconductor process in claim 58); the calibration run includes a series of simulation steps, each with corresponding actual measurements; the actual in-line process and the simulation process are completely automatic, being performed in parallel (corresponding to the means for facilitating the semiconductor process concurrently with running the semiconductor process based on virtual sensor measurements obtained during the semiconductor process in claim 58). In addition, the technical means of using the means to perform a time dependent simulation of the semiconductor process during the semiconductor process and without direct input from the semiconductor process is easily conceived by those skilled in the art. Therefore, given that claim 56 to which claim 58 refers does not possess inventiveness, the technical solution claimed by claim 58 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

59. Claim 59 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 7, Lines 61-64; Column 8, Lines 4-8 of the specification): results of calibration runs are compared with the actual measured parameters; (corresponding to the means for comparing said virtual sensor measurements with actual sensor measurements in claim 59); a determine matching process to convert step determines whether to convert simulated profile data using previous simulated data or actual data on the basis of the difference profile determined by the data comparison step (corresponding to the means for refining at least one of the best known input parameters and the physical model to obtain better agreement between the virtual sensor measurements with actual sensor measurements in claim 59). Reference 1 discloses the additional technical features of claim 59. Therefore, given that claim 55 to which claim 59 refers does not possess inventiveness, the technical solution claimed by claim 59 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

60. Claim 60 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 1, Lines 55-58; Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 and Lines 39-42 of the specification and Fig.2): the actual in-line measured data, such as orientation data, is measured and transferred to the simulation process through a network connection to the application server, or the remote access channel of a manufacturing control system, or the manufacturing control system, which corresponds to impliedly disclosing the means for sharing the computational load of the first principles simulation. Therefore, given that claim 55 to which claim 60 refers does not possess inventiveness, the technical solution claimed by claim 60 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

61. Claim 61 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 1, Lines 55-58; Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 and Lines 39-42 of the specification and Fig.2): the actual in-line measured data, such as orientation data, is measured and transferred to the simulation process through a network connection to the application server, or the remote access channel of a manufacturing control system, or the manufacturing control system, which corresponds to impliedly disclosing the means for sharing simulation information among interconnected resources to facilitate a process performed by the semiconductor processing tool. Therefore, given that claim 41 to which claim 61 refers does not possess inventiveness, the technical solution claimed by claim 61 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

62. Claim 63 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Claim 63 claims a method of facilitating a process performed by a semiconductor processing tool. Reference 1 (US5719796A) discloses a method and system for a statistical simulation of a semiconductor fabrication process, and in particular, the following technical features (see Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 6, Lines 34-44; Column 7, Lines 1-55; Column 9, Lines 4-14 and Lines 39-42 of the specification and Fig.2): fabrication equipment 210 (corresponding to the semiconductor processing tool in claim 63); acquiring process parameters by using test equipment (corresponding to inputting data relating to a process performed by the semiconductor processing tool in claim 63); two-run process of the simulation system including two different run modes of operation; input data being applied in several formats, but converted into a statistical distribution function before actual processing begins; each single simulation processing the input data in accordance with a corresponding physical or device model (corresponding to inputting a first principles physical model relating to the semiconductor processing tool in claim 63); the simulator performing the simulation according to input parameters and a probability density function model, and generating an output; results of the simulation being fed back to the fabrication process (corresponding to performing first principles simulation using the input data and the physical model to provide a simulation result for the process performed by the semiconductor processing tool; and using the simulation result as part of a data set that characterizes the process performed by the semiconductor processing tool in claim 63).

As can be seen, the technical solution claimed by claim 63 differs from the content disclosed in Reference 1 just in their titles and expressions, which is easily conceived by those skilled in the art. So it is obvious for those skilled in the art to combine common sense in the art with Reference 1 to obtain the technical solution claimed by claim 63. Therefore, the technical solution claimed by claim 63 neither possesses

prominent substantive features nor represents any notable progress, and thus does not possess inventiveness.

63. For the same opinions as those set forth with respect to claims 2-8, 10, 13 and 20-27, the technical solutions claimed by claims 64-67, 69-71, 73 and 76-84 neither possesses prominent substantive features nor represents any notable progress, and thus do not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law* either.

64. Claim 68 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 and of the specification and Fig.2): test equipment includes residual gas analyzers, spectral analyzers and similar data acquisition tools that are known in the art of manufacturing; if any WET data or in-line parameter is contained in the existing dataset, these WET data or in-line parameters replace computed values (corresponding to the content in claim 68: said inputting comprises inputting the data relating to a process performed by the semiconductor processing tool). In addition, the above-mentioned data as virtual sensor data from a simulation module is easily conceived by those skilled in the art. Therefore, given that claim 63 to which claim 68 refers does not possess inventiveness, the technical solution claimed by claim 68 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

65. Claim 72 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 of the specification and Fig.2): input data may be applied in several formats, but is converted into a statistical distribution function before actual processing begins (corresponding to the content in claim 72: said inputting a first principles physical model comprises inputting fundamental equations necessary to perform first principles simulation to obtain a simulation result); the simulator performs the simulation according to input parameters and a probability density function model, and generates an output; results of the simulation are fed back to the fabrication process (corresponding to the simulation result that can form part of a data set that characterizes the process performed by the semiconductor processing tool in claim 72). Reference 1 discloses the additional technical features of claim 72. Therefore, given that claim 63 to which claim 72 refers does not possess inventiveness, the technical solution claimed by claim 72 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

66. Claim 74 does not possess inventiveness as stipulated by Article 22, Paragraph 3

of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 of the specification and Fig.2): results of calibration runs are compared with the actual measured parameters; a determine matching process to convert step determines whether to convert simulated profile data using previous simulated data or actual data on the basis of the difference profile determined by the data comparison step; the actual in-line process and the simulation process are completely automatic, being performed in parallel (corresponding to performing first principles simulation to provide a simulation result that is a variation of a parameter tested by the concurrent process performed by the semiconductor processing tool in claim 74). Reference 1 discloses the additional technical features of claim 74. Therefore, given that claim 73 to which claim 74 refers does not possess inventiveness, the technical solution claimed by claim 74 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

67. Claim 75 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 3, Lines 55-57; Column 4, Lines 47-67; Column 5, Lines 1-67 of the specification): results of calibration runs are compared and parameters are updated as a result of these comparisons; the simulation is performed using these specific process parameters; the actual in-line process and the simulation process are completely automatic, being performed in parallel (corresponding to performing first principles simulation to provide a simulation result relating to a different parameter than a parameter tested by the concurrent process performed by the semiconductor processing tool in claim 75). Reference 1 discloses the additional technical features of claim 75. Therefore, given that claim 73 to which claim 75 refers does not possess inventiveness, the technical solution claimed by claim 75 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

68. Claim 85 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Claim 85 claims a system. Reference 1 (US5719796A) discloses a method and system for a statistical simulation of a semiconductor fabrication process, and in particular, the following technical features (see Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 6, Lines 34-44; Column 7, Lines 1-55; Column 9, Lines 4-14 and Lines 39-42 of the specification and Fig.2): fabrication equipment 210 (corresponding to the semiconductor processing tool in claim 85); acquiring process parameters by using test equipment (corresponding to the input device configured to input data relating to the process performed by the semiconductor processing tool in claim 85); two-run process of the simulation system including two different run modes of operation; input data being applied in several formats, but converted into a statistical distribution function before actual processing begins; each single simulation processing the input data in

accordance with a corresponding physical or device model (corresponding to the first principles simulation processor configured to input a first principles physical model relating to the semiconductor processing tool in claim 85); the simulator performing the simulation according to input parameters and a probability density function model, and generating an output; results of the simulation being fed back to the fabrication process (corresponding to perform first principles simulation using the input data and the physical model to provide a first principles simulation result for the process performed by the semiconductor processing tool, wherein the simulation result is used as part of a data set that characterizes the process performed by the semiconductor processing tool in claim 85).

As can be seen, the technical solution claimed by claim 85 differs from the content disclosed in Reference 1 just in their titles and expressions, which is easily conceived by those skilled in the art. So it is obvious for those skilled in the art to combine common sense in the art with Reference 1 to obtain the technical solution claimed by claim 85. Therefore, the technical solution claimed by claim 85 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness.

69. For the same opinions as those set forth with respect to claims 29-35, 37, 40 and 47-54, the technical solutions claimed by claims 86-89, 91-93, 95 and 98-106 neither possesses prominent substantive features nor represents any notable progress, and thus do not possess inventiveness as stipulated by Article 22, Paragraph 3 of *the Chinese Patent Law* either.

70. Claim 90 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of *the Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 and of the specification and Fig.2): test equipment includes residual gas analyzers, spectral analyzers and similar data acquisition tools that are known in the art of manufacturing; if any WET data or in-line parameter is contained in the existing dataset, these WET data or in-line parameters replace computed values (corresponding to said input device being configured to input the data relating to a process performed by the semiconductor processing tool in claim 90). In addition, the above-mentioned data as virtual sensor data from a simulation module is easily conceived by those skilled in the art. Therefore, given that claim 85 to which claim 90 refers does not possess inventiveness, the technical solution claimed by claim 90 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

71. Claim 94 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of *the Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67;

Column 7, Lines 1-22; Column 9, Lines 4-14 of the specification and Fig.2): input data may be applied in several formats, but is converted into a statistical distribution function before actual processing begins (corresponding to said processor being configured to input a first principles physical model comprising fundamental equations necessary to perform first principles simulation to obtain a simulation result that can form part of a data set that characterizes the process performed by the semiconductor processing tool in claim 94); the simulator performs the simulation according to input parameters and a probability density function model, and generates an output; results of the simulation are fed back to the fabrication process (corresponding to the simulation result that can form part of a data set that characterizes the process performed by the semiconductor processing tool in claim 94). Reference 1 discloses the additional technical features of claim 94. Therefore, given that claim 85 to which claim 94 refers does not possess inventiveness, the technical solution claimed by claim 94 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

72. Claim 96 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 7, Lines 1-22; Column 9, Lines 4-14 of the specification and Fig.2): results of calibration runs are compared with the actual measured parameters; a determine matching process to convert step determines whether to convert simulated profile data using previous simulated data or actual data on the basis of the difference profile determined by the data comparison step; the actual in-line process and the simulation process are completely automatic, being performed in parallel (corresponding to said processor being configured to perform the first principles simulation to provide a simulation result that is a variation of a parameter tested by the concurrent process performed by the semiconductor processing tool in claim 96). Reference 1 discloses the additional technical features of claim 96. Therefore, given that claim 95 to which claim 96 refers does not possess inventiveness, the technical solution claimed by claim 96 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

73. Claim 97 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Reference 1 discloses the following technical features in particular (see Column 3, Lines 55-57; Column 4, Lines 47-67; Column 5, Lines 1-67 of the specification): results of calibration runs are compared and parameters are updated as a result of these comparisons; the simulation is performed using these specific process parameters; the actual in-line process and the simulation process are completely automatic, being performed in parallel (corresponding to said processor being configured to perform the first principles simulation to provide a simulation result relating to a different parameter than a parameter tested by the concurrent process performed by the semiconductor processing tool in claim 97). Reference 1 discloses the additional technical features of claim 97. Therefore, given that claim

95 to which claim 97 refers does not possess inventiveness, the technical solution claimed by claim 97 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness either.

74. Claim 107 does not possess inventiveness as stipulated by Article 22, Paragraph 3 of the *Chinese Patent Law*. Claim 107 claims a system for facilitating a process performed by a semiconductor processing tool. Reference 1 (US5719796A) discloses a method and system for a statistical simulation of a semiconductor fabrication process, and in particular, the following technical features (see Column 3, Lines 48-57; Column 4, Lines 55-67; Column 5, Lines 1-67; Column 6, Lines 34-44; Column 7, Lines 1-55; Column 9, Lines 4-14 and Lines 39-42 of the specification and Fig.2): fabrication equipment 210 (corresponding to the semiconductor processing tool in claim 107); acquiring process parameters by using test equipment (corresponding to the means for inputting data relating to a process performed by the semiconductor processing tool in claim 107); two-run process of the simulation system including two different run modes of operation; input data being applied in several formats, but converted into a statistical distribution function before actual processing begins; each single simulation processing the input data in accordance with a corresponding physical or device model (corresponding to the means for inputting a first principles physical model relating to the semiconductor processing tool and the means for performing first principles simulation using the input data and the physical model to provide a simulation result for the process performed by the semiconductor processing tool in claim 107); the simulator performing the simulation according to input parameters and a probability density function model, and generating an output; results of the simulation being fed back to the fabrication process (corresponding to the means for using the simulation result as part of a data set that characterizes the process performed by the semiconductor processing tool in claim 107).

As can be seen, the technical solution claimed by claim 107 differs from the content disclosed in Reference 1 just in their titles and expressions, which is easily conceived by those skilled in the art. So it is obvious for those skilled in the art to combine common sense in the art with Reference 1 to obtain the technical solution claimed by claim 107. Therefore, the technical solution claimed by claim 107 neither possesses prominent substantive features nor represents any notable progress, and thus does not possess inventiveness.

75. Claims 62 and 110 claim a computer readable medium containing program instructions for execution on a processor, but essentially claim the program instructions contained in the computer readable medium. For computer programs per se, no matter in which form they appear, they fall within the scope of rules and methods for mental activities stipulated by Article 25, Paragraph 1, Item 2 of the *Chinese Patent Law*, and thus belong to the subject matters that shall not be granted a patent right.

For the above reasons, i.e. independent claims 1, 28, 55, 63, 85 and 107 and their dependent claims lack inventiveness and independent claims 62 and 110 fall within the scope of rules and methods for mental activities, the current application cannot be granted a patent right. Furthermore, no other substantive content that can be granted a patent right is included in the specification. Thus, even if the applicant makes amendments to the application documents, this application does not have a possibility of being granted a patent right. If the applicant fails to set forth convincing reasons within the time limit specified in this Office Action, the application will be rejected.

*Examiner: Mei MING*

*Code: A443*